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ABSTRACT

This report investigates ways in which Syracuse University's resources can be used more efficiently through new approaches to the delivery of continuing education courses in surrounding communities. It begins with a description of how the study's focus was determined. Four alternative delivery systems for providing continuing education services are described. A model for evaluating the relative merits of these systems against the initial goal statement is defined and applied. Finally, the evaluation results are presented in a cost-effectiveness comparison and the implications of the findings discussed. The report is intended to provide information useful for planning future continuing education programs. (Author/DAG)

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PLANNING FOR FUTURE UNIVERSITY COLLEGE PROGRAMS: A COST-EFFECTIVENESS EVALUATION OF ALTERNATIVE INSTRUCTIONAL DELIVERY SYSTEMS

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September 1976

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Abstract

The changing circumstances facing higher education institutions make it imperative that these institutions plan for the more efficient use of their educational resources. This report is the result of a study at Syracuse University that investigated ways in which the university's resources could be used more efficiently through new apprcaches to the delivery of continuing education courses in surrounding communities.

The report starts with a description of how the study's focus was determined: including the definition of a goal and its performance requirements for the particular continuing education activity under study. Four alternative delivery systems for providing continuing education services are described. A model for evaluating the relative merits of these systems against the initial goal statement is defined and applied. Finally, the evaluation results are presented in a cost-effectiveness comparison and the implications of the findings discussed. The report is intended to provide information useful for planning future continuing education programs.

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PREFACE

This paper is the final report of a study commissioned to explore the strengths and weaknesses of alternative systems for delivering continuing education courses to students in central New York. Of specific concern was the examination of how different alternatives vary in the potential cost-effectiveness of their utilization of the university's instructional resources.

Four specific alternatives were chosen for comparison. They ranged from having faculty teaching their courses at off-campus locations to various configurations of instructional technology. These alternatives were not intended to necessarily present realistic approaches, but rather to represent the variety of possible systems for delivering educational services. In addition, neither the study nor the report are intended to provide finite prescriptions of good and bad. Instead, the intent was to provide an information base and outline of the issues that would be useful to future planning efforts.

This study could not have been completed without the help of a number of people. A partial list of those people includes Deans Funk, Cecile, and Kempton from University College; Dean McIntosh from the School of Management; Dean Luker from the College of Engineering; Assistant Vice Chancellor Diamond, Drs. Eickmann, Kelly, and Pascarella, and Ms. Cashell from the Center for Instructional Development; Drs. Doughty and Ely from the Area of Instructional Technology; Dr. Albert Morris from Genesys Systems of Palo Alto; and finally Ms. DiPalma for her help in putting it all on paper.

PLANNING FOR FUTURE UNIVERSITY COLLEGE PROGRAMS: A COST - EFFECTIVENESS EVALUATION OF ALTERNATIVE INSTRUCTIONAL DELIVERY SYSTEMS

The changing circumstances facing higher education institutions today make it imperative that these institutions plan for the more efficient use of their educational resources. Only through such planning can these institutions hope to continue providing high quality educational services to their clientele. This report is the result of a study investigating the more efficient use of Syracuse University's educational resources through new programs that would make the university's services more accessible and more attractive to residents of the Central New York area.

Specifically, the purpose of this report is to provide planning information for the design of future University College continuing education programs. Four alternative models for delivering continuing education services are described and their attributes compared on a number of cost and effectiveness criteria. None of these alternative models are presented as realistic prescriptions for what should be done, but rather they are presented as "characteristic" or "ideal" types of solutions to certain problems in the delivery of continuing education services. Information gained from a comparison of the strengths and weaknesses of these ideals should be useful for the construction of more viable approaches tailored to fit this university's situation.

This report carefully documents the process and decisions underlying the study's final results. Careful documentation is necessary if the study's findings are to have any utility across a range of future planning situations. The report builds from a description of how the study's focus has been determined: including the definition of a goal and its performance requirements for the particular continuing education activity under study. Four alternative delivery systems for providing continuing education services are described A model for evaluating the relative merits of these systems against the initial goal statement is defined and applied. Finally, the evaluation results are presented in a cost-effectiveness comparison matrix and the implications of the findings are discussed. The report begins below by describing the study's setting.

THE SETTING

University College, the continuing education college of Syracuse University, administers a variety of programs designed to make the University's educational resources more accessible to the community. It would take several pages to summarize all of these programs, but ignoring non-credit and special purpose courses, workshops and institutes, the main body of credit bearing offerings can be summarized into three types of instructional arrangements. The first type of arrangement consists of regular University courses which are offered on-campus at night for continuing education students in the Syracuse area.[1] Another kind of instructional arrangement is provided by the Independent Study Degree Program. Under this program students travel to Syracuse from around the country for intensive week long instructional sessions with faculty The remainder of their course work is done at home. The third instructional arrangement involves sending the faculty to teach weekly sessions of their courses at off campus locations (in Corning, Endicott, Poughkeepsie, Rome, and Utica College). At most of these off-campus locations there are graduate degree programs in either management or engineering which are conducted in cooperation with local industries.

These three arrangements are alike in that they are all based upon the University's existing curriculum and its faculty. They differ in the way that the instruction is delivered to the student: in one arrangement the faculty do the traveling while in another, the students do the traveling This study was commissioned in the attempt to determine whether there might be a fourth arrangement, or "instructional delivery system," that would help University College to efficiently reach more continuing education students.

Specifically, the idea for this study grew out of the concerns and interests of administrators from both University College and the School of Management Each group had its own view of the University's role in providing continuing education services, and some key points are reviewed here.

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[1] Unless otherwise specified, "on campus" always refers to both the main campus and University College facilities.

University College was well aware of the growing demand for continuing education services. Enrollments in its programs had been increasing each year. They knew that in the future the University would be relying more on tuition income from University College to help meet expenses elsewhere in the University. University College's administrators wondered if some system could be found to reach and enroll more adults throughout the central New York region. To be successful, however, any new program would have to make more efficient use of existing instructional resources (course and faculty) and be supported by the faculty and departments who would offer the courses.

The School of Management, meanwhile, was heavily involved in current University College programs and they could see little room for expansion. Up to a third of its faculty's teaching load was already committed to these programs. They were interested in a reduced commitment. Assistant Dean Charles McIntosh thought he saw a solution to this situation. He had become familiar with an interactive instructional television system in use at other universities and wanted University College to consider the use of such a system here. The system's attractiveness lay in the ability to have one faculty member simultaneously teach several sections of a course at different geographical locations Such a television system would enable the School of Management to make more efficient use of its faculty's time.

University College was not in a financial or political position to act on Dean McIntosh's suggestion. Instead, University College decided to fund this planning study and began to confer with the Center for Instructional Development on various future possibilities. Later in the year, Dean Luker from the College of Engineering also became actively involved in the study. Although each party had its own viewpoint, they were all concerned with promoting the efficient use of the university's instructional resources through expanding or improving its continuing education services.

DEFINING THE STUDY

The study's initial charge was to evaluate the suitability of an interactive instructional television system for continuing education programs at University College.

This would provide a new instructional delivery system that would permit adults to participate in regular credit-bearing courses at off-campus locations throughout central New York. However, it was clear that there were some problems with this charge for the study. There would be little point to evaluating a specific solution (such as the television system) before more was known about the initial problem and possible alternate solutions Therefore, the first stage of the study was devoted to defining the problem and those variables that would determine the success of any new delivery system at University College.[2]

To better understand the problem, an informal evaluation was conducted to answer a variety of questions about the setting for any new delivery system. What were the goals or needs that a new delivery system would be intended to satisfy? Who would judge the suitability of a new delivery system, and on what basis would that judgement be made? What changes would a new system bring about? What would be the problems in its adoption?

To answer these questions, a series of interviews was held with people who had a variety of perspectives on continuing education, instructional delivery systems, or University College A report was prepared which summarized the comments from the first round of interviews and the same people were asked to react to this document. This interview process coupled with library research provided enough information to begin the design of the actual study.

Defining a system goal. Working from this information, it was now possible to define a specific goal for any delivery system that would be a successful solution to University College's situation. A goal statement was drafted and circulated to a number of people for comments and the following statement was the result.

> The delivery system should promote the more efficient use of the university's existing instructional resources by expanding course enrollments with new students previously unable to attend on-campus offerings.

This goal statement summarizes a number of specific requirements for a delivery

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[2] The term "delivery system" as used in this report refers to that set of processes, equipment, activities, or facilities needed to provide a student with an educational experience (i.e., a course).

system's performance. These requirements are based on the setting's characteristics and establish the parameters for the design of a workable solution. Any delivery system for this situation should:

-Attract new students to the university (and not draw students away from existing continuing education programs).
-Increase the accessibility of S.U courses to adults in the central New York area.
-Provide unique educational services that are not in direct competition with those provided by existing area institutions.
-Maintain the university's standards of instructional quality.
-Provide an efficient, suitable learning environment for adult students.
-Be compatible with the goals, activities, and responsibilities of university faculty and academic departments.
-Promote more efficient utilization of existing faculty and instructional resources.
-Be politically and financially possible within S.U.'s organizational structure.
-Require a relatively small initial investment of resources prior to any determination of actual performance.

The "ideal" delivery system would be the one which fulfilled these requirements in the most advantageous manner. The next stage in the study's design was the selection of alternative delivery systems for meeting this goal and its requirements.

Selecting alternative delivery systems. Two delivery systems were "givens" from the start of the study. One of these was the interactive instructional television system mentioned earlier. The alternative to this was simply to continue current activities. Specifically, a system already existed that sent faculty to teach in off campus centers each week, and this system could be expanded to serve new areas.

In order to select other alternative systems an analysis was made of the similarities and differences between these first two systems. This analysis would insure that the other systems chosen would illustrate different characteristics and thus provide a range of alternatives.

Some of the differences between the first two systems (here after referred to as the "Interactive Instructional Television " or "Live Lecture" systems) revolve around instructional characteristics like having the instructor present in the classroom as compared with "live" on the television monitor. They also differ on such administrative characteristics as financing schedules: The television system requires a large initial capital investment while the Live Lecture system has sizeable recurring costs for each

course taught.

Along with the differences between these systems there are two important similarities. First both systems teach all classes on a "live" or "real-time" basis and therefore require all students to be present at certain times and places each week for their classes. Second, both systems utilize a similar teaching-learning model. That is, the instructor is seen as the main vehicle for conveying the content of the curriculum (via lectures) while the students are seen in a passive group role all learning at the same rate.

Working from these similarities and differences, two additional delivery systems were chosen. One of these is known as the "Mediated Self-Instruction" system and it differs from both initial systems in that the course is not conducted on a "live" basis. Video tapes and other media are used to record the content of the on-campus class. The recordings are then supplied to off campus students working at special media centers.

The fourth and final alternative selected for study differs from all of the other systems in two ways: It allows students to take courses in their own homes and it moves the instructor out of the role of classroom lecturer. This system is known as "Guided Independent Study."

Some basic structural similarities and differences of the four systems are summarized in Table 1. It should be apparent that these delivery systems represent a range of approaches to the situation The report's next section describes how each system would function These systems then form the basis for the study's data gathering and evaluation activities.

TABLE 1

SOME CHARACTERISTIC DIFFERENCES BETWEEN
THE DELIVERY SYSTEMS

	LIVE LECTURE	INTERACTIVE INSTRUCTIONAL TELEVISION	MEDIATED SELF INSTRUCTION	GUIDED INDEPENDENT STUDY
Instructional Environment				
• Class time and location fixed?	Yes	Yes	Partly	No
• Students able to interact with instructor during class?	Yes	Yes	No	No
• Students able to work at their own pace?	No	No	Maybe	Yes
Faculty Role and Responsibilities				
• Off-campus sections added to on-campus courses with little impact upon teaching effort?	No	Yes	Yes(?)	Maybe
• Off-campus section requires change in instructional activities?	No	No	Maybe	Yes
System Costs				
• Large capital investment required for system start-up?	No	Yes	Yes	No
• High recurring costs for each additional course or off-campus section?	Yes	No	No	No

DESCRIPTION OF ALTERNATIVE SYSTEMS FOR DELIVERING INSTRUCTION AT OFF-CAMPUS LOCATIONS

On the following pages, each of the four systems is described as it would appear in the University College setting. In order to make these descriptions, assumptions had to be made about the future conditions in which these programs would be operating. There are three basic assumptions underlying the descriptions.

1. The potential market or audience for continuing education programs in the central New York area will continue to grow.

2. Syracuse University (through University College) will remain committed to continuing education in general, and specifically to programs which provide graduate and undergraduate instruction at a variety of locations in central New York.

3. The national economy remains stable, but the period of private industry's extensive support of educational programs is ending. Corporations may continue to provide tuition benefits and other incentives for employees, but they will not continue to underwrite the establishment of special programs and facilities for the exclusive use of their employees.

In addition to these general assumptions, three specific conditions are imposed upon the delivery systems to facilitate their description and comparison. The first condition is that the courses offered over the systems are intended to be taken for academic credit. Although the systems can also be used to deliver many kinds of non-credit programs, the true test of their utility is in their suitability for delivering regular academic courses.

The second condition is that all courses offered through the systems are (at least potentially) taught in the standard, small classroom, lecture format. This is not to say that all courses must consist of lectures, but rather that courses which require such formats as tutorial instruction (as in music or art) or detailed laboratory instruction (as in advanced sciences) may be impractical for off-campus situations. Aside from this restriction, the delivery systems pose few requirements upon teaching methods or instructional style.

The final condition imposed upon the systems' operations has to do with the geographical area being served. Although the systems have varying abilities at serving

larger or smaller areas, all systems will be assumed to operate within a seventy-five mile radius of Syracuse. When information is needed about the specific communities being served, those communities will be assumed to be Watertown, Oneida, Oswego, and Fulton. Under these assumptions and conditions, the characteristics of the delivery systems can now be described.

Live Lecture System

This is the accepted university teaching arrangement wherein the faculty member conducts live in-person class sessions with the students. Once during each week of the semester the faculty member travels to an off-campus center to conduct class. This approach is generally modeled after the existing system for course offerings at the off-campus graduate centers. Specific details follow.

Instructional Mode

Faculty role and responsibilities. Each semester, a faculty member could teach one off-campus section of a course already offered on campus. In other words, a faculty member would teach the same course, in the same way twice, but in different locations. There might be some differences in the teaching-learning activities if the original, on-campus, course utilized special library or other instructional facilities. The faculty member is responsible for the usual teaching, administration, and evaluation activities associated with any course.

Student responsibilities and instructional environment. Off-campus students would participate in the same kinds of instructional activities (reading, attending lectures, preparing papers, etc.) as their on campus counterparts. All courses would be taught in relatively standard classroom environments. Off-campus students would experience the usual benefits (and problems) of studying with their peers on a group-paced schedule.

Evaluation and Feedback

Testing and grading procedures would be the same for both off-campus and on-campus students. Most feedback, corrections, and explanations would be handled as a normal part of in class interaction. Off-campus students needing additional help could talk either with the instructor on class night, or with a fellow student.

Administration

University College would handle classroom scheduling and maintenance, as well as student registration procedures. A local "counseling office" would be maintained by University College in the community and operated on a part-time basis. The standard university procedures would be followed for admitting students to degree programs.

Physical and Technical Facilities

Space would be rented from local schools, churches, businesses, or similar institutions with available instructional and office space. A classroom would consist

of standard black board and seating arrangements. Special equipment, such as movie projectors, would have to be brought from campus by the instructor.

Interactive Instructional Television System

This delivery system is currently in use at Stanford University and a number of other schools. The system is based on two-way audio, and one-way video, instructional television presentations of regular university class sessions. As the faculty member instructs an on campus class, he/she is transmitted "live" to several off-campus classrooms equipped with television monitors. Students in the off-campus classrooms are able to interact with the instructor and participate in the on-campus class using special audio installations.

Instructional Mode

Faculty role and responsibilities. Under this system, a faculty member would teach his on-campus class in a normal fashion. The only changes would be the presence of television cameras in the classroom and the occasional interruptions of off-campus students in the remote classrooms. Most normal classroom teaching techniques could be employed with little modification.

Some activities such as reviewing homework, administering tests, and grading procedures might have to be changed or managed differently to accommodate a large number of off-campus students. Generally, some of the non-instructional activities (like testing) could be conducted at the off campus classrooms with the help of a graduate assistant. At some point in the semester, however, the instructor would have to devote some time to meeting the off-campus students personally

Student responsibilities and instructional environment. Students would receive the same instruction and perform similar activities in both on-campus and off-campus locations. The off campus students would, of course, be seeing their instructor on television rather than in person. There could be as many as three or four remote classrooms participating in the same course via television.

There would be some minor differences in the course for off-campus students. Since they would receive course hand-outs, books, and other materials through the mail, the off-campus students would experience some delays in receiving these materials. Off campus students might also be required to drive to campus once during the semester to meet with faculty - or, in special cases, to take exams or complete some other activity. Off-campus students (like those on campus) would have classmates to confer with, but might have to rely more on their own initiative and motivation to keep up with the course.

Evaluation and Feedback

Grading practices and standards would be the same for all students. Tests at off-campus locations would be administered by a graduate assistant or similar person hired through University College for the purpose. Students needing help beyond class sessions could work with other students in the class, or could call the instructor on the phone during specified "office" hours for off-campus students.

Administration

University College would handle the classroom scheduling and maintenance

procedures as well as course registrations. A local "counseling office" would be maintained in a community where there were classrooms hooked into this system, and the office would be staffed on a part-time basis. In addition, University College would be responsible for helping the faculty member with test administration, mailing of hand-outs or corrected papers, and the provision of text books for off-campus students. The faculty member could handle the more immediate administrative details in class (i.e., due dates for assignments). Finally, University College would be responsible for providing and maintaining the technical and engineering functions necessary to the transmission/reception of the televised class sessions.

Physical and Technical Facilities

Space would be rented from local schools or other institutions with suitable instructional space. Both off-campus and on-campus classroom facilities would be maintained by University College. The on-campus classrooms would be equipped with two cameras and separate microphones for the instructor and the class. Special lighting and acoustical treatments might have to be added in some cases (a specific set of classrooms would be chosen for use in this system). A speaker system would also have to be installed in the classroom to hear questions from off-campus students. Additional technical facilities would be needed to transmit the signal, but these would be outside the classrooms in some central location on campus. The off-campus classrooms would be equipped with one or more monitors (depending on class size), a microphone, and any facilities needed to receive the signal.

Miscellaneous

Special arrangements might be made with instructors for the tape recording of the original class sessions for possible replay under specific, contracted situations. Copyright and royalty provisions would have to be established with individual faculty.

The facilities costs, and operation of this system are specifically modeled upon the television delivery systems constructed for various universities by Genesys Systems of Palo Alto, California.

Mediated Self-Instruction System

This system is based on the use of prerecorded tapes of class sessions. The faculty member teaches his/her on campus class every week. Television cameras record the class on tape. The following day, duplicates are made of the tape and sent to each off-campus class location. The off-campus students can view the tape locally at any-time for the next week, and are expected to work on the same basic schedules as the on campus students.

Instructional Mode

Faculty role and responsibilities. The basic activities of the instructor in this system are not too different from those of any regular course. The faculty member conducts regular on-campus class sessions, which are recorded by television cameras. The instructor can probably teach the course in his usual way, but might have to modify some activities to accommodate the off-campus students who would have no way to participate in the original class. Homework, assigned projects, and other activities would be the

same for all students except that due dates would be adjusted slightly to accomodate the delayed schedule of the off-campus students. The faculty member would also have to provide "office hours" each week when the off-campus students could phone for assistance. Finally, arrangements would be made for the faculty member to meet personally with the off-campus students.

Student responsibilities and instructional environment. Students would perform similar activities and receive nearly the same instruction at both on-campus and off-campus locations. Any differences in the instructional experience would be due to the fact that the off-campus students do not participate in a "live" class: they view a taped presentation at their convenience and do not necessarily meet with other local, off-campus students in the course. The off-campus students would view the lectures on a video-tape playback unit at a local media center maintained for this purpose (perhaps a "learning resources center" in the local library or school). Other kinds of instructional materials might also be available in the center (audio tapes, slides, etc.).

For on-campus students, the only change entailed by this system is the presence of television cameras in the back of the classroom.

Evaluation and Feedback

Off-campus students would have to fulfill the same course requirements as the on-campus students. Specific times would be set for the administration of exams, and these exams would be monitored by graduate assistants or those responsible for the off-campus facilities. Off-campus students could receive feedback on their work by phone or in personal conference with the instructor. They would be expected to come to campus at least once during the semester to meet their instructor. The instructors might also make an occasional trip to the media centers.

Administration

University College would equip and maintain on-campus classrooms suitable for recording good quality tapes. These classrooms might include special acoustic and lighting treatments in addition to camera and microphone installations. The off-campus facilities would include video-tape playback units, a motion picture projector, slide projector, tape recorders, study carrels and other equipment, as needed. This facility would be operated and maintained by University College; however, it might be possible to collaborate with a local library or school in running a learning resources center. Video-tape duplicating and other production facilities would be maintained on campus.

Miscellaneous

Special copyright agreements would have to be established with the faculty. Generally, tapes of class sessions would only be available during the semester that the course was offered on campus. Additional and long term uses of the tapes would be subject to the agreement of the faculty member.

Guided Independent Study System

The "Guided Independent Study System" is so named because it relies on students managing their own learning using specially designed materials which replicate the original, on-campus course (without requiring live class sessions). In other words, the off-campus course would be equivalent to the on-campus course in content, but different in instructional activities. Each off campus student would receive a

carefully structured syllabus including all the materials and activities necessary to complete the course at home. These materials would be designed by the instructor to replace lectures and class sessions as the primary teaching strategy; providing exercises, programmed materials, and special readings in their place. The faculty member would meet personally with all off-campus students twice each semester for counseling and testing purposes.

Instructional Mode

Faculty role and responsibilities. This approach is based on a reorganization/reallocation of faculty time and responsibilities. Rather than spending a few hours each week preparing and conducting each class session, the instructor would do all of his class preparation in advance of the course. Through University College, the faculty member would be provided with the financial, material, and personnel support to redesign his course. The redesigned course materials would consist of a complete package of instructional materials that would enable students to complete the course without attending regular class sessions.

The course would be offered to off-campus students only during semesters when the course was also being offered on campus. All tests and grading procedures would be as similar as possible to the on-campus course. Off-campus students would come to campus twice during the semester to meet with the instructor and take any required exams. The faculty member would also be available to off campus students by phone for certain hours each week.

Student responsibilities and instructional environment. Students would basically be responsible for managing their own learning. Although the content and instructional objectives would be the same for both on-campus and off campus versions of the course, the off-campus students would not have a weekly class meeting to guide and structure their learning activities. The specially designed materials are intended to replace the management/organization function of the class sessions however; the student has to keep himself motivated and working on schedule Off-campus students will also have to work without the support and interaction of fellow students. The main advantage for the students is, of course, that they can work on the course whenever and wherever they please.

Evaluation and Feedback

Off-campus students would be expected to complete the same kind of projects and tests, and be graded according to the same standards as on-campus students. Students experiencing trouble with their work could talk with the instructor on the phone, or visit campus and work with a graduate assistant hired to help run the course.

Administration

University College would be responsible for providing a faculty member with the resources to design the off campus version of the course (including instructional development, production, or evaluation help, if necessary). Registration procedures, course mailings, and related activities would be the responsibility of University College

Physical and Technical Facilities

As a rule, this system would not require any special hardware or instructional space However, twice each semester (on Saturdays) the off-campus students would come to the university to meet with the instructor, and facilities would have to be provided for those sessions.

Miscellaneous

Copyright and royalty agreements would have to be established with faculty members for the materials they develop. The Center for Instructional Development has worked out such agreements in the past. It is assumed that a set of course materials would be good for a limited number of years before revision.

This completes the description of the alternative systems to be evaluated in this study. The next section of the report presents a variety of data on the cost and effectiveness of these systems as they would function in the University College setting. On the following page is a brief summary of all four delivery systems which may be useful for reference purposes during the presentation and discussion of the evaluation's findings.

LIVE LECTURE

The Live Lecture System is the accepted university teaching arrangement wherein the faculty member conducts live, in-person, class sessions with the students. Each semester, a faculty member could teach one off-campus section of a course that he/she normally teaches on campus. One night during each week of the semester, the faculty member would travel to an off-campus classroom to meet with the students and teach the class. Off-campus students would receive the same instruction and perform the same learning and assessment activities as on-campus students. Course registration and administration procedures would be handled by University College in conjunction with the faculty member's academic department. The faculty member would be reimbursed for his traveling expenses in addition to being paid for teaching the course. Travel time to and from the off-campus class would average an hour or less in each direction.

INTERACTIVE INSTRUCTIONAL TELEVISION

This system is based on two-way audio and one-way video, closed circuit, television presentations of regular university class sessions. As the faculty member instructs an on-campus class, he/she is transmitted "live" to several off-campus classrooms equipped with television monitors. Students in the off-campus classrooms are able to interact with the instructor and participate in the on-campus class using special audio installations.

A faculty member using this system could teach his/her on-campus class in a normal fashion. The only changes would be the presence of television cameras in the classroom and the occasional interruption for a question from an off-campus student. Most classroom teaching techniques could be employed with little modification. Off-campus students would have their tests administered by a graduate assistant. For individual help, off-campus students would be expected to meet with the faculty member once during the semester and could call him/her by phone during specified office hours. Registration procedures, the administration of the off-campus classrooms, and the provision of books, supplies and televised lectures would be handled by University College (in conjunction with the academic departments). The faculty member would receive appropriate compensation for teaching the course, and would be assisted by at least one graduate assistant. Each faculty member would have absolute control over the right to make any recordings or reproductions of the televised lectures.

MEDIATED SELF-INSTRUCTION

This system is based on the use of prerecorded video tapes of class sessions. The faculty member teaches his/her regular on-campus class every week. Television cameras record the class on video tape. Later that week, duplicate video tapes are made and sent to each off-campus class location. The off-campus students can view the tape locally at anytime during the next week and are expected to keep up with and follow the same general schedule as the on-campus students. Faculty members would be available to off-campus students by phone during specific office hours each week. Off-campus students would also be expected to come to campus once or twice during the semester for personal counseling, testing, or instructional purposes. In short, off-campus students take the same course as on-campus students, but they do not participate in a "live" class, and hence, are more responsible for managing their own learning.

The video tape recording and distribution system (and other administrative details) would be handled by University College in conjunction with the academic departments. Special copyright agreements covering all uses of the tapes would be worked out with each faculty member. For their participation, faculty would receive appropriate compensation and the help of at least one graduate assistant.

GUIDED INDEPENDENT STUDY

The Guided Independent Study System is so named because it relies on students managing their own learning using specially designed materials which replicate the original, on-campus course without requiring live class sessions. The faculty member who normally teaches the on-campus course would design materials (e.g., exercises, programmed booklets, or special readings) to replace lectures and class sessions as the primary teaching strategy. Each off-campus student would receive a carefully structured instructional package including all materials and activities needed to complete the course at home. Off-campus students would usually come to campus twice each semester for assessment or special instructional activities. The faculty member would also be available to students by phone during specific hours each week.

This approach is based on a reorganization of the faculty member's time and instructional responsibilities. Rather than spending a number of hours every week in preparing and conducting each class session, the professor would do all of his/her preparation before the semester begins. Through University College (with the cooperation of the school or department) the faculty member would be provided with the financial, personnel, and material support to redesign his/her course for the off-campus students.

EVALUATION OF THE DELIVERY SYSTEMS

As mentioned earlier, the general purpose of this study is the provision of planning information for decisions about future continuing education services. This purpose can now be defined more specifically and operationally as the comparison of the characteristics of four systems for delivering continuing education services against a specific institutional goal for the performance of those systems. The evaluation and comparison of the systems' strengths and weaknesses is guided by a set of criteria for judging the most acceptable system. The system which excels on all or most of the criteria should be the system best suited for meeting the goal. Figure 1 illustrates the over all structure of the evaluation.

As shown in the figure, six criteria have been selected for evaluating the delivery systems. These criteria were chosen by considering the characteristics of the University College setting, the goal and nature of the delivery systems, and the information needs of the administrators responsible for this kind of planning. Taken together, these criteria form a cost effectiveness framework for comparing the systems, and the cost-effectiveness perspective has been used throughout the design and conduct of this study.

Cost-effectiveness analysis is simply a technique for determining which system fulfills the goal in the most advantageous manner. The determination of "most advantageous" involves the relationship of each system's inputs to its outputs (the cost versus the outcomes realized from a given approach). For University College programs, the relevant inputs and outputs involve more than monetary issues. For example, there are the "costs" of securing the faculty's willingness to participate in a new program, and such "outcomes" as student attitudes, achievement, and the university's reputation. The six criteria used here were chosen for their ability to illustrate a range of the most important cost and outcome considerations from the university's viewpoint. Each criterion is defined below in terms of the questions it poses for the evaluation of the delivery systems.

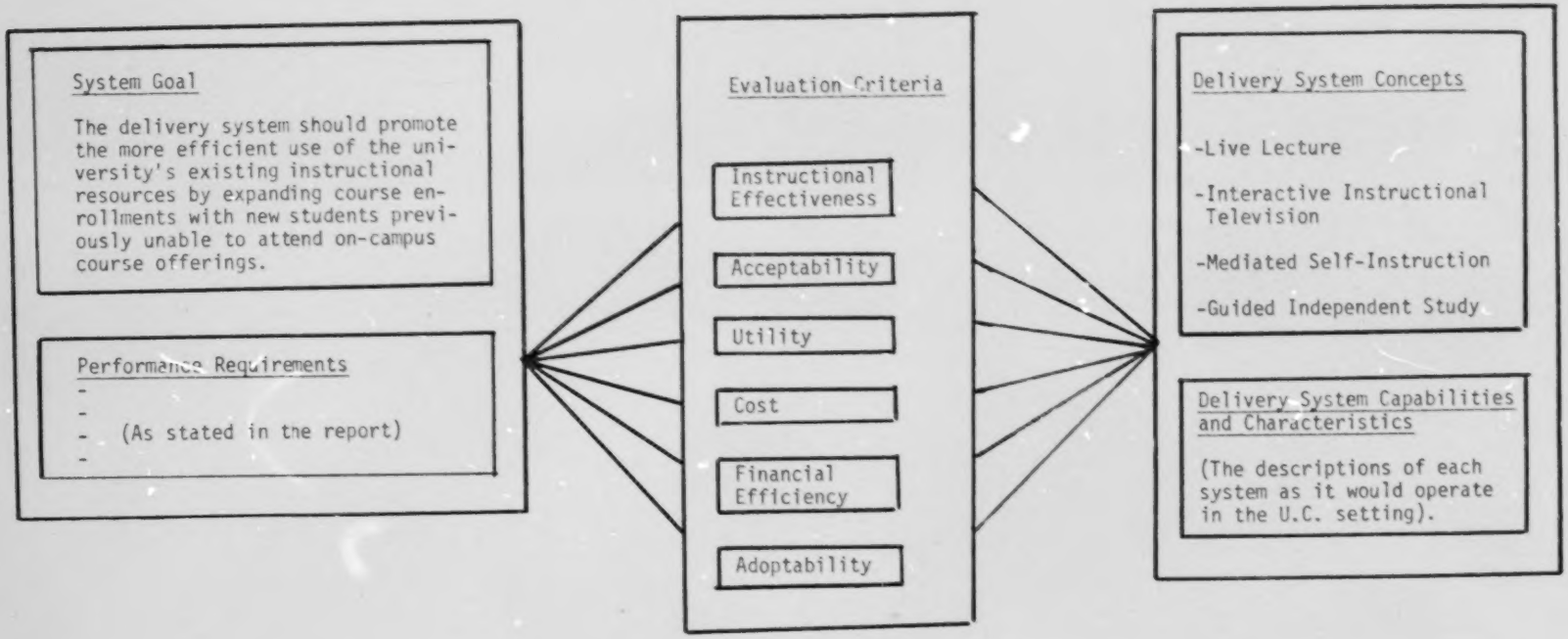
System Goal
The delivery system should promote the more efficient use of the university's existing instructional resources by expanding course enrollments with new students previously unable to attend on-campus course offerings.
Performance Requirements
-
-
- (As stated in the report)
-
Evaluation Criteria
Instructional Effectiveness
Acceptability
Utility
Cost
Financial Efficiency
Adoptability
Delivery System Concepts
-Live Lecture
-Interactive Instructional Television
-Mediated Self-Instruction
-Guided Independent Study
Delivery System Capabilities and Characteristics
(The descriptions of each system as it would operate in the U.C. setting).

Figure 1. Conceptual relationship between the goal statement, evaluation criteria, and the concepts and ascribed characteristics of the delivery systems. Adapted from Kazanowski (1968, p. 116).

Instructional Effectiveness

Which delivery system(s) would provide the most effective teaching-learning environment for the adult learner? Specific points to be considered here include:

-Convenience. Which system provides the most convenient means for students to take courses?

-Instructional adequacy. Which system provides the best learning environment for adult students?

-Desirability. Which system is likely to be the most attractive to students?

Acceptability

Which delivery system(s) would be the most acceptable to the faculty who would have to work with them?

Utility

Which delivery system(s) would be the most functional from an administrative viewpoint? Specific points to be considered include:

-Uniqueness. Would any system replicate or compete with existing programs run by this university or other area institutions?

-Marketability. Which system(s) would be likely to attract a large enough clientele to be financially successful?

-Exportability. Which system(s) would make it easiest to offer educational services in a changing variety of settings?

-Dependability. Which system(s) would function consistently with a minimum of administrative problems?

Cost

What is the monetary value and functional nature of the resources required to develop and operate each system?

Financial Efficiency

What is the financial efficiency of each system over ten years at different enrollment levels?

Adoptability

Which system(s) would be the easiest innovation to adopt with the University College setting?

The comparison of four delivery systems across these criteria is a complex task. A variety of qualitative and quantitative data are needed to judge the efficiency of each system on each criterion. Several criteria pose questions which are almost

impossible to answer within this study (although the questions must still be raised). To keep the report as clear as possible, the evaluation findings will be presented on a criterion-by-criterion basis. When the delivery systems have been compared within each criterion, a final section will present a cost-effectiveness comparison matrix to examine the relative efficiency of all four systems across all six criteria.[3] The comparison of delivery systems by criterion follows immediately below.

Instructional Effectiveness

One of the basic considerations in comparing the four delivery systems is whether they characteristically differ in the quality of educational experience they offer students. How do they differ in their ability to teach adult students? There are a number of issues involved in answering this question but only major points can be presented here. Comments are offered on the comparative effectiveness of different educational media in terms of student instructional and attitudinal outcomes, and certain characteristics of adult learners. Information in these areas comes from expert opinion and major reviews of research findings.

Before examining the research, a distinction must be drawn between the various instructional media and instructional methods that are employed in the delivery systems. The four systems represent different configurations of instructional media for teaching off-campus students. Names for the delivery systems were chosen to emphasize the nature of the media employed. The instructional medium of each delivery system represents a specific set of technical characteristics and the requirements for teaching and learning inputs.

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[3] No attempt will be made to derive specific input-output (cost-benefit) ratios for each system since such ratios require too many assumptions and summarize too much data to be meaningful in this situation. The cost-effectiveness approach used here allows the systematic comparison of both qualitative and quantitative data. See Doughty (1972), Doughty and Bailby (1974), or Levin (1975) for complete explanations of the cost-effectiveness approach.

Delivery System	Instructional Medium
Live Lecture	Face-to-face, small group, classroom instruction.
Interactive Instructional Television	Television used as a two-way communication medium to bring off-campus students "into" the instructor's classroom. The system has two-way audio and one-way video capabilities.
Mediated Self-Instruction	Off-campus students study at media centers by viewing video cassettes of class sessions. Television is used here as a one-way medium since classes are not "live" for off-campus students and they cannot interact with the instructor during class.
Guided Independent Study	Off-campus students work at home with materials prepared to replace class sessions with equivalent instructional experiences.

Within the medium of each delivery system, a variety of instructional methods may be employed to convey the course content. For example, the face-to-face medium may employ such methods as lectures, simulations, or class discussions. Various instructional methods are likely to be more or less appropriate for different students, subject areas, or media. The exploratory nature of this planning study is such that detailed comparisons of these variables are omitted from consideration. Of primary concern here is whether the media employed by the delivery systems are potentially able to provide an instructional experience of the same quality as is found in on-campus courses. Generally, it will be assumed that the original on-campus class is a small group lecture or lecture-discussion situation. Research reviewed for this study examines the main effects of changing media attributes: face-to-face instruction as compared with one-way or two-way television, or as compared with other independent study materials.

Student Achievement

Television. In 1967 Chu and Schramm published a review of research comparing the instructional effectiveness of television against traditional classroom techniques. After reviewing 421 comparisons in 207 seperate studies they concluded that there were no overall differences: Students in various courses at different grade levels learned

equally well using either traditional classroom or instructional television approached. These findings, however, seemed somewhat less true for older students.

Dubin and Hedley (1969) completed an additional review of research examining the comparative effectiveness of instructional television for teaching college courses. Their initial review of 42 studies containing 193 independent experimental comparisons showed that face-to-face classroom techniques have a significant instructional advantage over television. This advantage disappeared, however, when results from 26 comparisons using two-way (interactive) television were removed from the overall comparison. That is, student achievement was lower in courses taught by two-way television and equivalent in courses taught under one-way television or face-to-face conditions.

The comparative effectiveness of television and face-to-face instruction was further analyzed by holding instructional method constant. For this comparison Dubin and Hedley used only those studies in which lecturing was the teaching method employed in both fact-to-face and television treatments. Once again they found that one-way television was as good as face-to-face instruction, and that two-way television was decidedly inferior.

Dubin and Hedley's findings have implications for three of the delivery systems being considered here. Mediated Self-Instruction basically employs one-way television while the Live Lecture and Interactive Instructional Television systems are based on face-to-face and two-way television (and all systems are likely to rely on the lecture method). The demonstrated inferiority of two-way television to both one-way television and face-to-face techniques is hard to explain. Two-way television is designed to simply extend the interactive possibilities of classroom lecture conditions to remote locations. Dubin and Hedley offer the following conclusions.

> Our overall evaluation is that the issue is not entirely settled. We do think that the evidence points to two-way television instruction as being definitely detrimental. It simply does not measure up to comparable face-to-face instruction. This is a curious certitude in the results because the motivation to introduce two-way television was precisely to replicate as nearly

> as possible the live instructional situation. Perhaps, indeed, the medium is related to the message, as McLuhan asserts, and because two-way television tries to be live (therefore the "other" medium) it fails to get across its instructional content (1969, p. 16-17).

What these findings imply for overall judgements of instructional effectiveness will be considered in light of other conclusions on student attitudes and the characteristics of the adult learner. But before continuing to those topics, attention must be given the nature of student achievement under Guided Independent Study.

Independent study. Research reviewed thus far has little to say about student achievement under the Guided Independent Study approach. Studies summarized by Campeau (1974) and Jamison, Suppes, Wells (1974) show that media appropriate to the Guided Independent Study format (tape recordings, programmed instruction) are generally as effective as face-to-face instruction. Properly designed programmed instruction may even have a slight advantage over face-to-face instruction, and generally results in the more efficient use of student time.

Guided Independent Study, however, does not necessarily imply that course materials will receive the kind of intensive development effort needed to produce good programmed instruction materials. Most courses would simply be repackaged with additional "directed" readings, transcripts of lectures, and other materials to make up for the lack of class sessions. Costin (1972) reports on comparative student achievement studies where the experimental treatment is reasonably similar to what the Guided Independent Study students would receive. Costin reviews 27 studies on the achievement of college students in face-to-face lecture courses as compared with a variety of self-instruction techniques (directed reading, reading plus exercises, etc.). Generally the self-instruction treatment was as effective as face-to-face lectures, and more effective in a few cases. These findings when added to the television research mean that at least three of the delivery systems employ media which are equivalent in terms of student achievement (Live Lecture, Mediated Self-Instruction, and Guided Independent Study).

Student Attitudes

Research on student attitudes toward instructional media is fragmented and hard to interpret for continuing education students. Most studies report the preferences of regular undergraduates whose attitudes (and ability to act upon those attitudes) may be different from adult off-campus students who might be more concerned with the accessibility of courses than anything else. A few characteristic findings on media attitudes are reviewed here.

Attitudes towards innovations. One of the most basic findings on attitudes towards new instructional media parallels the literature on attitudes towards any innovation: people differ in their initial acceptance, but are more favorable towards an innovation once they have tried it. Dubin and Hedley (1969) report that students are generally favorable towards the prospect of televised courses but are even more favorable after they have experienced them. These findings are also supported by Brown (1976) with adult learners in an open learning system. As for basic preferences, Dubin and Hedley report that college students prefer the use of television over participation in large, impersonal, lecture courses; and they prefer small-group classroom instruction over both. However, student perceptions of the quality of instruction are more important than the nature of the medium employed.

Convenience. Another common theme of research on attitudes toward instructional television has to do with convenience. Students view television courses favorably because such courses are perceived as more convenient for studying purposes. After reviewing several studies, Trent and Cohen reported that, "Students liked the freedom and flexibility the method allowed them, although the student attitudes toward the televised lectures were related to the individual lectures and type of course being televised (1973, p. 1025)". Trent and Cohen go on to report findings from one study showing markedly lower drop-out rates for a television as compared to a conventionally-taught course. The interpretation of these findings was that students drop a course when they feel hopelessly behind; this does not occur if lectures are always available on video-tape.

Finally, Smith (1975) reports that adult students are enthusiastic towards off-campus televised courses because of the time saved by not having to travel to campus. A majority of a sample of 90 students said they would be willing to pay an additional fee for their televised course equal to 150% of their expenses for commuting to campus.

Perceived difficulty. The last aspect of the research to be reviewed here considers attitudes as a function of the student's perception of the amount and kind of studying required by different instructional media. Doughty (1972) reports that college students view individualized courses (similar to Guided Independent Study) as too time consuming in comparison with conventional classroom courses. In reality, the individualized courses are less time consuming but require more active and self-directed participation by students. Traditional instruction (and perhaps televised lectures) allow the student to assume a more passive learning role and is therefor perceived as easier.

Two implications for the delivery systems can be drawn from these observations on student attitudes. First, the preferred system would be the one which provides the most flexible teaching-learning structure. That is, the more physically accessible the courses are and the more easily the required activities can be adapted to fit individual studying schedules, then the more likely it is that students will view the courses favorably. The Guided Independent Study and Mediated Self-Instruction systems would rate highest in this area. A second implication of the attitude studies is that the preferred delivery system would be the one whose teaching/learning environment most closely resembles traditional, small group, classroom instruction. Basically, the more the learning experience resembles the conditions of the conventional classroom, the fewer innovative behaviors are required, and the "easier" the courses are assumed to be. The Live Lecture and Interactive Instructional Television systems would rate highest from this perspective. Obviously, the student attitude findings provide conflicting conclusions for the delivery systems. However, the specific educational requirements of the adult learner have yet to be reviewed and they provide the last set of considerations for judging the overall instructional effectiveness of the different systems.

Characteristics of Adult Learning

In recent years a growing number of educators have been emphasizing the unique nature of adult education: andragogy as opposed to pedagogy. Most issues in this area are quite familiar to those working in continuing education settings and no attempt will be made to review them all here. Instead, an outline is provided of those points which seem most relevant to the evaluation of the delivery systems' instructional effectiveness. This outline is based on the conclusions of Malcolm Knowles (1970).

> Andragogy is premised on at least four crucial assumptions about the characteristics of adult learners that are different from the assumptions about child learners on which traditional pedagogy is premised. These assumptions are that, as a person matures, 1) his self-concept moves from one of being a dependent personality toward one of being a self-directing human being; 2) he accumulates a growing reservoir of experience that becomes an increasing resource for learning; 3) his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles; and 4) his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness. (p. 39)

Knowles goes on to define these four assumptions in terms of specific principles for andragogy. A selection of these principles are reviewed below.

Self-concept

-The physical and psychological climate should be one in which adults feel comfortable, respected, supported and generally treated as joint inquirers with the instructor.

-An adult will be more deeply motivated to learn those things he sees the need to learn. Adults should be involved in self-diagnosis of their own learning needs.

-The learning-teaching transaction should be the mutual responsibility of learners and teacher. The teacher should be more of a catalyst than an instructor; he is a resource person and co-inquirer.

-Evaluation of learning should be a mutual process between teacher and student.

Experience

-Adults should be viewed as teaching resources. Their wealth of experience should be recognized and applied meaningful to facilitate their own and other students' learning experiences.

Readiness to learn

-The curriculum should accomodate the changing social role and learning needs of the maturing adult.

Orientation to learning

-Adults engage in learning activities as a result of personal needs or pressures. They have a problem-centered orientation to their reasons for taking a course which should be considered when structuring the learning experience.

-The content of a learning experience should be person-centered rather than discipline-centered.

Other principles could be defined, but these are representative and satisfactorily outline the important characteristics of an adult learning environment. From these principles, one could conclude with Knowles that there are important differences between adult and adolescent learners. These differences reflect their life styles and experiences, their attitudes towards education and towards themselves as learners, and their styles of learning, and educational needs. With this in mind, the basis for judging the suitability of the various delivery systems for adult learners is straight forward; the best system is one which allows or promotes specialized attention for adult learners both as individuals and as a distinct type of learner. The corollary to this is that the worst delivery system would be the one which simply appends adult learners onto existing, on-campus courses for regular university students.

These conclusions pose a problem for the delivery system concept proposed as the focus of this study. The whole idea of "delivery systems" is to promote the more efficient use of existing instructional resources by making the university's courses more accessible to off-campus (adult) students. This conception is seemingly inimical to the conclusion that educational services must be designed to meet adult needs. However, it is apparent that the four delivery systems vary in their potential ability to provide a suitable learning environment for adults, and they can be judged on that basis.

The Guided Independent Study and Mediated Self-Instruction systems have a mix of advantages and disadvantages for adult learners. Knox (undated) emphasizes the importance of the learning pace; Adults learn most effectively when they can work at their

own pace. Both of these delivery systems have the advantage of enabling adults to work at their own pace in a low-threat environment; however, there are two accompanying disadvantages. First, neither system provides a socially reinforcing environment for learning. They provide little possibility for meaningful social interaction or feeling of involvement in a joint learning activity. Mediated Self-Instruction has a slight advantage here in that it enables students to meet informally at the media center. A second disadvantage relates to the courses themselves. Neither system allows off-campus students to participate in the original course: Students receive warmed-over, repackaged materials. Although no system provides for the extensive redesign and development of its courses, the Guided Independent Study system does allow for some consideration of the needs of off-campus students. When the materials are selected to replace the original lectures and class sections, minor adjustments or additions can be made to adapt the original course to the needs of adults.

The Live Lecture and Interactive Instructional Television systems reflect a parallel set of advantages and disadvantages. Both systems provide their students with a chance to meet and work with fellow students, but both systems require group paced instruction and may be mildly threatening to some students. In spite of this last comment, however, the Live Lecture approach seems to be the system most suited to adult learning characteristics. The Live Lecture system is most likely to provide courses with a comfortable, motivating environment where the instructor can at least treat each class (if not each student) as an individual case.

This concludes the review of various factors affecting the instructional effectiveness of educational experiences provided by the delivery systems. The remaining task is to combine these various observations into a single set of judgements on the instructional effectiveness of these systems.

Summary and Conclusions on Instructional Effectiveness

Under the criterion of instructional effectiveness the delivery systems have been compared in terms of student achievement, attitudes, and suitability for the adult learner. In each of these areas there were few clear findings of superiority for

any of the systems. On student achievement, the media comparison studies indicated that both one-way television and independent study resulted in achievement comparable to that of students receiving face-to-face instruction. Two way television appeared to be less effective than face-to-face or one-way television instruction. However, the practical utility of this finding could be questioned given the successful records of degree programs offered over interactive instructional television systems.[4] When student attitudes towards the media were examined, it was found that students would like the Guided Independent Study or Mediated Self-Instruction systems for their convenience, and the other two systems for their provision of a traditional learning environment. Overall, one could conclude that the Guided Independent Study and Live Lecture systems would be most favorably received as the most convenient and the most traditional systems. Finally, the observations on the characteristics of adult learners suggest that Live Lecture provides the best environment for adults with Guided Independent Study in second place.

From this discussion, three basic themes have emerged which serve to summarize the instructional effectiveness issue. These themes are reviewed below in terms of the questions they pose for the evaluation of the delivery systems.

Convenience. Which system provides the most convenient means for students to take their courses? The Guided Independent Study system would have to be judged as the most convenient system for students. This system does not require weekly travel, provides for a variety of course offerings, and permits the most efficient use of students' time. Mediated Self-Instruction and Interactive Instructional Television would be the second and third most convenient systems. Live Lecture would come in last since it requires weekly travel, a strict group-paced time frame, and can only offer a limited number

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[4] Unfortunately, there is little experimental evidence of the successfulness of recent programs using interactive instructional television with off-campus students. The practical experience of schools such as Stanford University, Southern Methodist University, and the University of South Carolina has not shown there to be any major problems with the instructional effectiveness of these systems.

of courses at each location (a faculty member can only teach a course at one location at a time).

Instructional adequacy. Which system provides the best learning environment for adults? Live Lecture and Guided Independent Study systems seem equally suitable overall; one system would sometimes be better than the other depending on the nature of the course and specific student characteristics. All four systems should produce acceptable achievement levels, but differ in their ability to motivate, adapt to, or direct the learning activities of adult students.

Desirability. Which system is likely to be the most attractive to students? The Live Lecture and Guided Independent Study systems would probably be the most attractive to adult students. Whether one of the two systems was perceived as better than the other would depend on student concern for efficiency as compared to personal interaction. The systems might also differ in their desirability according to the subject matter being taught.[5]

In conclusion, the findings on instructional effectiveness show no system as being completely inappropriate, but do suggest that either the Live Lecture or Guided Independent Study systems could be judged more favorably than the others on this criterion.

Acceptability

The second criterion for judging the relative merits of the four systems is concerned with faculty attitudes. Specifically, which delivery system(s) would be

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[5] In survey results from 169 of approximately 280 faculty teaching courses through University College, Live Lecture was rated as the system that would be most desirable to off-campus students. In response to the item, "Considering all advantages and disadvantages, which system do you think most off-campus students would prefer?" 77% of the faculty said Live Lecture, 12% said Interactive Instructional Television, 2% said Mediated Self-Instruction, and 6% said Guided Independent Study.

the most acceptable to the faculty who would have to work with them?

This criterion is an important one for several reasons. First, University College programs require strong faculty support to even exist, and many planning decisions are based on administrators' perceptions of faculty attitudes. Second, faculty attitudes towards a particular system are likely to affect the quality of the instructional presentation.[6] Third and finally, faculty who have experience in teaching on and off-campus continuing education courses may be the best and most informed critics of new programs in this area.

Two kinds of information will be used to determine the nature of faculty reactions to the delivery systems. A short review of past research on faculty attitudes towards instructional media will be presented. This will be followed by a description and explanation of the results of a survey conducted at this university to gather the reactions of faculty towards the suitability of the four delivery systems.

Research on Faculty Attitudes

Aside from broad case studies on academics and institutional change (e.g., Fashing and Deutsch, 1971; Ladd, 1970), there has been relatively little research on specific attitudes towards their own instructional role, setting, or responsibilities. Research that has most immediate relevance here focuses on faculty attitudes towards television teaching. Once again Dubin and Hedley (1969) provide one of the most inclusive reviews of this television research. Their conclusions are outlined below.

Faculty are generally more favorable than unfavorable towards instructional television.
In any sample of faculty there are usually more favorable than negative opinions. However, the largest group is likely to be neutral and most attitude shifts are into and out of the neutral category.

Personal impac reduces acceptance.
Positive attitudes towards the use of television are likely to decrease as the faculty actually begins to face the prospect of using television to teach their own courses.

Faculty attitudes vary by rank, class size, department and previous experience.
Faculty members at the instructor rank are likely to be more

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[6] See Bondeson (1975) or Lumsden (1974) for comments related to these first two reasons.

favorable towards the use of television than assistant, associate, or full professors. Assistant and associate professors are likely to be the most negatively inclined of all. Faculty who teach large lecture courses are likely to view television favorably. The percentage of faculty who are pro-, con-, or neutral varies from department to department. Faculty are likely to have a more favorable attitude towards television (or other instructional media) if they have had some previous experience with it.

Faculty feel that television teaching requires more work than traditional instruction.

All studies examining the effects of television teaching on course preparation show that professors require more time to prepare for televised than non-televised lectures. Most faculty feel that they should be given a reduced course load when teaching a televised course.

Faculty think that instructional television is as good or better than conventional instruction in holding student attention and stimulating student interest.

The most cited weakness of instructional television is the loss of the personal student-teacher relationship.

The landmark study on faculty attitudes towards instructional television was conducted by Evans, Smith, and Colville (1962). They surveyed the attitudes of 319 full-time faculty (80% of the entire faculty) in a large metropolitan university. They also conducted in-depth personal interviews with over a third of their sample who were either strongly for, or against, the use of television. Their findings have been included in Dubin and Hedley's review, but some of Evans et al.'s summary comments are worth repeating here for their elaboration of the points above.

> Our respondents' strongest reason for opposing ITV centered around the lack of personal contact with students. They said that even if ITV reaches more students, what could a professor do about such problems in the viewing situation as distractions, a lack of intellectual atmosphere, or a lack of proper motivation? Would these not interfere with acquiring knowledge through television? A professor, they added, might become convinced that television lectures would reduce his teaching load and leave more time for research, but he could still oppose ITV because of the greater difficulty of teaching through the medium. Some felt that without feedback from students, controversial viewpoints expressed by the teacher might be misinterpreted. They pointed out that a teacher might find television acceptable for straight lecture presentations, particularly when he considers the advantage of being able to re-use good lectures and thereby present them to an even larger number of students; however, for the teaching of laboratory courses, he would find this method inferior. While some of our respondents admitted that ITV is economical, effective, and efficient (from the university's standpoint), they felt that an instructor might be justified in fearing it as an innovation which might even lead to widespread unemployment of classroom teachers (pp. 70-71).

> Quality education, we were repeatedly told by our respondents involves more than just transmission of information and training in skills. This extra ingredient, they felt, is present in the more traditional teaching methods, but lacking in ITV and teaching-machine programs. (p. 143)

These findings provide an interesting background for theorizing about faculty acceptance of the various media and delivery systems being considered here; however, the research has a number of shortcomings that limit its utility for decision making at University College. Most of the studies reviewed were concerned with attitudes towards replacing traditional instruction with television classes. This is not the situation posed by the four delivery systems where the issue is faculty attitudes towards means of reaching additional students without changing current practice. Dubin and Hedley's review also did not contain studies that asked faculty to consider personal advantages and disadvantages of a range of instructional media. More specifically, there were no studies reporting on faculty attitudes about one-way as opposed to two-way (interactive) television. Does two-way television put back the missing ingredient which accounts for the superior "quality" of live classroom instruction? Given these and similar shortcomings of the existing research, and the importance of knowing the attitudes of this university's faculty towards possible continuing education programs, the decision was made to conduct an original survey as part of this study.

Acceptability of the Delivery Systems to Syracuse University Faculty

A survey was designed to investigate the attitudes of Syracuse University faculty towards the four delivery systems. The main intent was to determine which of the systems would be most acceptable to the faculty who would have to work with them. In addition it was hoped that the survey would identify those aspects of each system which shape the faculty's attitudes towards the system as a whole. The survey would be conducted with full-time faculty currently teaching courses through University College. These faculty were selected because they are the ones most involved with continuing education programs and most likely to influence the nature of future programs.

Working from the literature on attitudes towards innovations, and specifically faculty attitudes toward instructional television, a 98 item survey instrument was constructed. This instrument (included in Appendix A) gave faculty respondents a brief description of each delivery system and asked them to report the extent of their agreement/disagreement with each of 20 statements describing system characteristics. Respondents were also asked to give their overall preference for the four systems and complete some demographic data. All returns were anonymous.

University College mailing lists were used to determine which university faculty should receive the survey. Campus mail was used to send the survey to 61 faculty in the School of Management, 77 faculty in the School of Engineering, and 153 faculty in all other university schools and colleges for a total population of 291 faculty. Both the initial and single follow-up mailings were addressed to each faculty member on the stationary of the dean of either University College, Engineering, or Management. Survey returns were coded and processed by computer. Many returns contained additional comments and these are presented in Appendix A.

Returns were received from 201 faculty (69% of those surveyed). Of these returns, 169 were complete, and usable for analysis. The following results are based on those 169 returns representing 58% of the original population.

Survey Results: The demographic data showed that 21% of the respondents were assistant professors, 33% were associate professors, and 37% were full professors. Forty-one percent of the faculty had taught off-campus courses at centers in Corning, Endicott, Poughkeepsie, Rome, or at Utica College. Eighteen percent said they had used instructional television to teach a course.

Three items asked faculty to judge the overall acceptability of the four systems. When asked, "Which system would you most prefer to use in teaching off-campus students?" an overwhelming number (78%) chose the Live Lecture system. When they were asked, "Which system would be your second choice?" the responses were divided mainly between Interactive Instructional Television (46%) and the Guided Independent Study (28%). Finally, they were asked, "Considering all advantages and disadvantages, which system do you think

most off-campus students would prefer?" and once again the great majority (77%) chose the Live Lecture system. On all three items Mediated Self-Instruction received very little support.

Faculty responses to the rest of the survey parelleled their direct choice of first and second place systems. Their opinion of each delivery system to the set of 20 statements as applied to each system is summarized in Table 2. A statistical analysis of these responses was conducted to determine whether faculty reactions to one delivery system differed significantly from their reactions to any other system. The responses were treated as a single factor experiment with repeated measures on the same element (each respondent reacted to all four systems). Bio-Medical Data's program 08V for analysis of variance with repeated measures was used and the summary table is included in the appendix. The F ratio used to test the hypothesis that differences in faculty reactions to the 20 items would be a function of the four systems was significant at the .05 level.

The Scheffé procedure was used to test all possible comparisons between the means. The results show that responses to the Live Lecture system were significantly different from any of the other three systems. The responses to Interactive Instructional Television were also significantly different from the responses to Mediated Self-Instruction, but not to the responses for Guided Independent Study. In summary, this analysis of the survey shows that faculty are most favorable towards the use of the Live Lecture system with Interactive Instructional Television and Guided Independent Study rating as poor second and third choices.

Conclusion. The findings from the survey of this university's faculty agree with earlier studies at other universities in showing that faculty have a strong preference for the traditional classroom mode of instruction. This preference is based on a number of factors, not the least of which is a very real concern for the quality of instruction offered through other kinds of educational arrangements. Although it is unlikely that this preference can be changed, it is possible to introduce new arrangements to meet specific instructional needs. Some related issues will be considered under

TABLE 2

FACULTY REACTIONS TO FOUR SYSTEMS ON SURVEY ITEMS

After reading a brief description of a given delivery system, faculty were asked to indicate the extent of their agreement with each of the following statements as they applied to that system. This process was repeated for each of the four systems. They responded on a five point scale for each item ranging from 1 for strong agreement to 5 for strong disagreement with a specific statement. Note that some statements express negative opinions while others express positive opinions towards a system. The scale is summarized as: SA A N D SD
1 2 3 4 5

Mean Response to Each System				Statement
Live Lecture	Interactive Instruc. TV	Mediated Self-Ins.	Guided Inde. Study	
1.70	2.97	3.38	2.95	The use of this system would help off-campus students maintain their motivation to complete the course.
3.86	2.54	2.43	2.70	Most off-campus students who took courses offered through this system would feel that they are receiving a "second-hand" education in comparison to that of on-campus students.
3.95	3.00	2.81	2.70	This system is not suitable for teaching most courses in my subject matter.
2.97	2.92	2.92	2.89	This system could improve the quality of many courses by causing professors to devote more attention to their teaching.
3.59	2.19	2.19	2.41	Many faculty would feel uncomfortable working in this kind of instructional environment.
3.86	3.05	2.70	2.84	The use of this system would contribute to a trend towards the lowering of academic standards and would generally have an adverse effect on the quality of the University's curriculum.
2.11	3.32	3.59	3.43	Most faculty would support the use of this system with continuing education programs.
2.35	3.05	3.49	3.59	This system would enable me to teach more students with little, if any, loss in the quality of instruction.
3.62	3.19	2.70	2.49	I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
3.84	2.62	2.24	2.43	This system would never work well because it limits the instructor's ability to adapt the instruction to the needs of the students.
2.24	3.49	3.78	3.62	This system would provide the kind of quality education people expect from a private university.
2.14	3.08	3.38	3.35	This system would be appropriate for most university courses and subject areas.
3.14	2.95	2.81	2.86	The use of this system would create political problems for some academic departments.
2.46	2.43	2.57	2.97	Overall, this system should help the University to make more efficient use of its faculty and instructional resources.
1.70	2.78	2.89	2.84	This system would attract new adult students to S.U. courses.
3.27	3.24	3.03	2.57	I feel that using this system would take too much of my time away from research and other activities necessary for promotion.
2.54	3.73	3.95	3.57	Most off-campus students would feel that this system provides enough opportunities for interaction with faculty.
2.24	3.19	3.46	3.32	I would definately be willing to teach one of my courses using this system.
2.08	2.68	2.86	2.72	Testing and grading procedures could be handled efficiently under this system.
3.86	2.81	2.43	2.51	This system promotes an undesirable trend towards the standardization and commercialization of higher education.

the criterion of adoptability.

Utility

So far this report has compared the four delivery systems from the perspective of students and faculty; the "utility" criterion compares the systems from an administrative viewpoint. The concern of this criterion is with how well the systems would function in practice. Four specific issue areas are the focus of the discussion: uniqueness, exportability, dependability, and marketability. Relatively little can be said on some of these issues at this time, but their importance to administrative decision making necessitates their consideration here. Issues related to system costs are also of concern to administrators and will be considered separately in the next section of the report.

Uniqueness

The question here is whether any of the delivery systems would replicate or compete with existing programs run by this university or other area institutions. Programs based on each of the four delivery systems would probably overlap with existing educational services to some extent, but they would also attract their own clientele. The question is one of degree.

Residents of the central New York area could participate in such existing programs as the Independent Study Degree Program, or Empire State College. Many residents could also commute to Syracuse to take courses through University College. However, for various reasons many adults who could enroll in these programs do not. The reasons for non-participation probably have little to do with tuition costs. A report by O'Meara (1973) shows that of 2.4 million American workers covered by union contracts with tuition aid and other education benefits, only 5.3% of these workers ever use the benefits. Perhaps better explanations are provided by surveys like those reported by Eggert (1974) for the University of Mid-America. These surveys show that adults differ widely in their preferences for why, how, when, and where they wish to continue their educations. Such preferences are likely to influence their enrollment in different kinds of programs.

Each delivery system would create a different kind of continuing education program, and a different mix of advantages and disadvantages from the potential student's point of view. The basic question is one of determining which program/delivery system arrangement would be attractive to the greatest number of students. In a time of increasing demand for continuing education programs, it seems likely that new kinds of programs will attract new kinds of students without detracting from or competing with existing programs.

Marketability

The discussion on the uniqueness of the four systems leads into the question of their marketability: Which system(s) would be likely to attract a large enough clientele to be financially successful? This is one of the most pragmatic and essential questions that has to be dealt with in planning any new educational service. Unfortunately, it is one of the hardest questions to answer and although it must be raised it is beyond the scope of this study to answer it.

There would be little point in using the market research data from other settings to make predictions about the delivery systems. Such data often has low predictive ability in its original setting and could hardly be generalized to different alternative systems. Original data must eventually be collected for this particular situation. However, this activity should wait until the specific nature of the proposed off-campus program is known.[7]

Even a preliminary study like this one cannot be conducted without some consideration for market size (or enrollment level). The approach to be used here is to specify a variety of different enrollment levels and examine system costs as a function of those levels. This approach divides the initial question of marketability into two parts. It allows the financial feasibility of each system to be compared while allowing separate consideration of the reality of the enrollment projections. This procedure will be explained in greater detail later in the report.

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[7] The cost of gathering market research data will be included in the cost comparisons of the systems.

Exportability

There are two remaining aspects of the utility criterion to be considered, exportability and dependability. These areas differ from the two above in that they allow some specific judgements to be made about the potential performance of the four systems. Under exportability, the concern is whether a delivery system has any secondary usefulness for programs that do not involve the straight delivery of courses at specific locations. That is, which system would make it easiest to provide educational services in a changing variety of settings? Such a system should increase the overall efficient use of the university's instructional resources.

Both of the television-based delivery systems have a similar set of characteristics when it comes to exportability. When either one-way or two-way television systems have been installed at other institutions, they usually included the establishment of a video-tape library of all classes offered over the system. These video-tapes can then be reused (and rented) by students in different programs or institutions. Establishing such a library is easy and inexpensive, but may have relatively low utility. People have a dislike for "reruns" and are likely to view the taped courses as being of lower quality simply because they have not been developed for them. Furthermore, faculty are likely to resist the continued "resale" of their presentations. Most faculty do not design their class lectures to be preserved for posterity and would want to maintain close control over the disposition of the video-tapes. Overall, the Interactive Instructional Television and Mediated Self-Instruction systems have a rather uncertain ability to provide materials likely to be useful for programs other than the original off-campus classes they were designed to serve.

Syracuse University currently has experience with the exportability of the kind of instructional services that could be provided under either the Live Lecture or Guided Independent Study formats. University College has found many markets for live instructional services. Each year a number of programs are run for special audiences by contracting for faculty services to conduct the programs. The limitations of this approach are its cost and high demand upon available faculty resources. In addition, faculty

are only exportable to a limited degree. They are likely to resist involvement in programs which require long absences from Syracuse.

Syracuse University's Project Advance regularly "exports" university courses through a system somewhat similar to Guided Independent Study. Each course offered through Project Advance has undergone an extensive development process which generally replaces the professor's classroom lecture with a set of original materials specifically designed and tested for their instructional effectiveness. University faculty design and offer these courses on campus, and work with Project Advance and local teachers to deliver these courses for credit to several thousand students in high schools around the state. See Diamond and Holloway (1975) for further details on this program.

Compared as delivery systems, Project Advance and Guided Independent Study have a number of differences. Project Advance, however, does demonstrate the advantages of a delivery system which is not organized around the instructor as sole purveyor/conveyor of course content. Therefore, considering the four delivery systems compared here, the Guided Independent Study system seems to offer the greatest potential for easily exportable educational services.

Dependability

The last aspect of administrative utility to be considered here is dependability: Which system(s) would function consistently with a minimum of administrative effort? The basic answer to this question is that they can all function consistently if they are properly set up. The performance record of the delivery systems in use at Stanford, Colorado State, and other institutions (see Diamond, 1975; Morris, 1974) shows that any of these systems can consistently deliver their educational services.

Aside from this general statement, one could conclude that the Live Lecture system might be easier to use from an administrator's point of view. First of all many of the week-to-week details can be taken care of by the instructor during class. The same would also be true of the Interactive Instructional Television system, except that this system requires some attention to the details of testing and homework. The Live Lecture system also has an advantage in not requiring the maintenance of large quantities

of equipment or facilities. However, the system's operation could suffer from the travel problems brought on by the vagaries of the Syracuse winter. Finally, there are the administrative problems related to scheduling faculty class times, rooms, etc. The Guided Independent Study and Mediated Self-Instruction systems are able to avoid many of these schedule problems, but substitute others. Overall, the Live Lecture approach would be the simplest to install and operate. Some related issues will be discussed under the criterion of adoptability.

Conclusion. This completes the discussion of administrative utility. Relatively few specifics could be given although the issues had to be raised. As further information is gathered and some preliminary decisions reached, characteristics from these four systems are likely to be combined in arriving at a realistic delivery system. When that planning stage is reached it will then be possible (and essential) to develop meaningful answers to the questions of uniqueness, marketability, exportability, and dependability.

Cost

The criteria reviewed thus far have provided more qualitative than quantitative comparisons of the inputs and outputs of different delivery systems. Within the criteria of Cost and Financial Efficiency, however, various monetary inputs and outputs can be compared on an explicit numerical basis. The present section provides descriptions of and comparisons between the nature and size of the component costs for each system. The following section (Financial Efficiency) relates the total dollar costs for running each system to different projections of enrollment levels and tuition rates.

Cost Model

Developing a cost comparison of the four systems is a complex undertaking. From the descriptions of the four delivery systems it should be apparent that each varies widely in the nature and size of expenses it entails. For example, the Live Lecture system requires large expenditures for faculty salaries while the Interactive Instructional

Television system requires a large expenditure for television production/distribution hardware. In addition to knowing how much each system costs, it is important to understand how those costs relate to system performance. In the example above, expenditures for faculty salaries would vary with the number of courses offered, while expenditures for television equipment would remain relatively constant no matter how many courses were offered. Therefore, in order to define and compare the dollar costs of the different systems' input categories, the development of the system comparisons have been based on some specific cost modeling concepts.

A cost model is a representation of the way in which certain input components function to produce a measure of system cost. Cost models are developed to reflect the nature of the items being costed and to provide information for a given decision making situation. For this study the cost model has to facilitate the comparison and manipulation of a standard set of cost (or input) components across all four delivery systems. In addition, the cost model has to produce a meaningful measure of the overall cost for each system. One of the most useful overall cost measures for university administrators is the unit cost for delivering one course to one student. The cost model will be designed to produce that measure.

Working from the suggestions of various costing theorists and practitioners (e.g., Doughty and Beilby, 1974; Jamison and Klees, 1975; Haller, 1974; Wagner, 1975) a four-part input structure was defined as the basis for a delivery system cost model. The model defines the average cost of delivering one course to one student (at a given enrollment level and class size) as a function of research and development costs, investment and production costs, operating costs for instruction, and operating costs for administration. Each of the cost models components is outlined below.

> Research and development costs. This category includes those resources needed to develop the delivery system (or a specific system component - like an individual course) to the point where it can begin operation. For example, the costs of conducting a market analysis to determine where the courses whould be offered is appropriately classified as a research and development cost. For three of the delivery systems, research and development costs are fixed and nonrecurring, for Guided Independent Study the

course development costs are recurring over time and over the number of courses being developed.[8]

Investment and production costs. This category covers those resources necessary to implement the program. These are fixed, generally nonrecurring costs typified by capital investments for such things as television, facilities renovation, etc. The only exception to this is Mediated Self-Instruction which has a variable cost for video-tape supplies depending on how many courses are being taught.

Operating costs for instruction. Included in this category are all costs attributable to delivering a single course's instructional experience to a given group of students. Faculty salaries are one of the costs attributable to this category. Most instructional operating costs are fixed and recurring on a course-by-course basis. The cost of some items (i.e., telephone service) are variable depending on the number of students in the course (and recur according to the number of courses of that size being offered).

Operating costs for administration. This category includes those resources expended in maintaining a functioning delivery system on a year-to-year basis. Salaries for program administrators and office expenses are typical costs included under this category. Most system administration costs are fixed and recur on a yearly basis for the projected life of the delivery system.

So far the cost model is static. It provides a means of categorizing system costs, but there is no way to "run" the model to produce data on the average cost per student. Three variables are involved in "running" the model: the number of students enrolled in courses offered through a delivery system, the number of courses offered through a delivery system, and the time span (in years) for comparison of system costs.

Numerical estimates for these three variables have been determined in a number of ways. The time span for the comparison of average per-student costs has been arbitrarily set at ten years. Given the rather large capital investments involved in two systems,

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[8] A distinction is drawn here between fixed and variable, recurring and non-recurring costs. Fixed costs are those costs that remain the same no matter how large or small the program becomes. For example, a given professor's salary is the same no matter how many students enroll in his courses. Variable costs, however, change with program size. Thus the average per-course cost of telephone service varies directly with the number of off-campus students enrolled. Fixed and variable costs may also be either recurring or non-recurring for a specific cost projection. For example, a fixed cost for facility rental recurs on a monthly or yearly basis while the cost of media production equipment (another fixed cost) is considered a non-recurring cost (although there is a recurring cost for maintenance and replacement).

a reasonably long projection is necessary to amortize initial costs and realize economies of scale. Student enrollment projections have been selected arbitrarily. System costs will be compared at different enrollment levels from 100 to over 2,000 students per semester. Finally, the number of courses being offered through a system is also determined arbitrarily and is tied to the particular enrollment level employed in the comparison. Specifically, the number of courses[9] is determined by setting an average enrollment level per course and dividing that into the given enrollment level per semester. Individual sets of minimum and maximum per-course enrollment levels are used to predict number of course offerings and are referred to as Model I and Model II predictions. Table 3 provides details on how the number of course offerings is determined.

The addition of these three variables to the cost input structure creates a general, functioning cost model that can be represented as

$$S_a = \frac{(R+D)_t + (I+P)_t + OI_t + OA_t}{E_t}$$

where S_a = Average cost per-student per-course

$(R+D)_t$ = Total research and development costs. (These costs are fixed and non-recurring with the exception of course development costs under the Guided Independent Study system.)

$(I+P)_t$ = Total investment and production costs. (These costs are fixed and non-recurring except for the cost of video-tape under Mediated Self-Instruction.)

OI_t = Total operating costs for instruction as determined by
$OI_t = (OI_a)(C)$
where OI_a = Average operating costs per course,
and C = Number of courses being offered.

OA_t = Total operating costs for administration as determined by
$OA_t = (OA_a)(Y)$
where OA_a = Average administrative costs per year
and Y = number of years

E_t = Total enrollment for the period of the cost comparisons.

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[9] "Number of courses" refers to the simple number of different courses being taught. It does not refer to the number of course sections. For example, when the Interactive Instructional Television system is used, it simultaneously provides instruction to four off-campus and one on-campus classrooms. There are five sections to this course, but only <u>one</u> course is being offered.

Table 3

DETERMINATION OF NUMBER OF COURSE

OFFERINGS BY ENROLLMENT LEVEL

Average Class Size Predictions

Delivery System	Model I	Model II
Live Lecture	18	30
Interactive Instructional Television	36	150
Mediated Self-Instruction	36	150
Guided Independent Study	36	150

Model I predictions represent the average minimum per-course enrollments for each system. The figure of 18 students under Live Lecture was chosen because it is the class size presently needed to run courses at the existing, off-campus graduate centers. The figure of 36 students for each course offered under the other systems was arbitrarily chosen to be twice that of Live Lecture since it represents enrollments across five classrooms* or for a group of at-home students.

Model II predictions represent the average maximum per-course enrollments for each system. The figure of 30 students under Live Lecture was chosen because it is the standard maximum figure for a "small" lecture-discussion class. The 150 student per course figure for Interactive Instructional Television and Mediated Self-Instruction systems represents 30 students per class location. The guided Independent Study system uses the same prediction to be comparable.

Number of Course Offerings by Enrollment Level**

Predicted Semester Enrollment	Number of Course Offerings			
	Model I		Model II	
	Live Lecture	All Others	Live Lecture	All Others
100	5.5	2.8	3.3	1
500	27.7	13.9	16.7	3.3
1000	55.5	27.8	33.3	6.7
1500	83.3	41.7	50	10
2000	111	55.6	66.7	13.3
2500	138.8	69.4	83.3	16.7

* There are five classroom locations: Oswego, Fulton, Oneida, Watertown, and on-campus.

** All courses assumed to be standard three credit courses.

This cost model is more an outline than an accurate description of how each system's cost prediction is arrived at. For example, fixed costs are rarely the same from year to year due to interest charges, depreciation rates and projected salary increases. However, the cost model does provide an overview of the costing procedures used here. The following discussion uses the four input categories to describe the costs of each delivery system.

Live Lecture

Costs for the Live Lecture system are presented in Table 4. Generally these costs are based on the description of the system's hypothetical operation as described earlier in this report. Estimates for items like office and instructional supplies, or faculty salaries, are based on the costs of similar, existing University College programs. Some of these estimates were based on information supplied by Dean Kempton at University College. A brief explanation of each cost category follows. Specific explanations of some items are included in the footnotes to the table.

Research and development costs. The main expenditures here are for personnel and the preliminary study. Personnel costs represent a general estimate for the amount of administrative support needed to plan and set up the operation of this system. The program administrator is at a higher rate here than under the regular administrative operating costs since the planning stage is likely to involve a high-level administrator (or special consultants). The cost estimate for the preliminary study is based on the estimate used by Genesys Systems for the cost of its preliminary study on the market and facility needs for its instructional television system. It is very hard to specify an accurate dollar estimate for this kind of research activity. This particular estimate is the same across all four systems and recognizes the importance of some kind of market analysis or needs assessment research as part of the planning activities for any new continuing education program.

Investment and production costs. There are no investment and production costs for this system since the delivery medium is the instructor himself, and no new facilities or materials need to be created. (In a sense, the costs for producing the courses have

TABLE 4

COSTS FOR LIVE LECTURE SYSTEM

Research and Development Costs[1]			
Personnel			
Program administrator (6 mos. at $20,000/year)	$10,000		
Secretary (6 mos. at $6,000/year)	$ 3,000		
Fringe Benefits (at 24.5% of above)	$ 3,185		
	Total Personnel Costs:	$16,185	
Office Expenses ($1000 per office/year)		$ 1,000	
Preliminary Study (Market Analysis, etc.)		$20,000	
	Total Research and Development Costs:		$37,185
Investment and Production Costs			
NONE			
Operating Costs - Instruction			
Personnel[2]			
Faculty course instructor (12.5% base salary of $20,560)	$ 2,570		
Fringe Benefits (24.5% of above)	$ 630		
Dislocation allowance	$ 1,000		
	Total Personnel Costs:	$ 4,200	
Travel (One round-trip of 150 miles per week at $.15/mile)		$ 113	
Instruction Supplies[3]		$ 150	
Facilities - Classroom Rental[4]		$ 20	
Telephone Service (under Model I)[5]		$ 75	
	Total Instructional Costs Per Course:		$ 4,633
Operating Costs - Administration			
Personnel[2]			
Program administrator (at $15,000/year)	$15,000		
Secretary (at $6,000/year)	$ 6,000		
Fringe Benefits (at 24.5% of above)	$ 5,145		
Four half-time area representatives (at $3,000 each)	$12,000		
	Total Personnel Costs:	$38,145	
Facilities			
Administrative Office Space (Existing U.C. facilities)	$ ----		
Local area office rental ($100 a month for each of four offices)	$ 4,800		
Office expenses (Two full-time, and four part-time offices)	$ 4,000		
	Total Facilities Costs:	$ 8,800	
Advertising and Brochures[6]		$ 7,836	
	Total Administrative Costs Per Year:		$54,781

Explanatory notes on next page.

NOTES TO TABLE 4

[1]Research and Development Costs cover only those costs attributable to the implementation of this specific system. Money allocated for a Preliminary Study under this and the other systems recognizes the need for specific kinds of market research or needs assessment data to guide the development of any new instructional system. The estimate of $20,000 is based on Genesys System's prediction for its own preliminary study. This figure may be off by as much as 50% in either direction depending on the amount of research and other activities preceding the decision to implement a particular system.

The program administrator position is funded at a higher level here to allow for the use of consultants or to reflect the demand for additional high-level administrative support during this formative period.

[2]All recurring salary costs are assumed to rise by 5% each year over the ten year planning period. The figures given here represent the salary costs for the first year (based on 1976 data). In Appendix B is a table which outlines the projected salary and fringe benefit increases. The faculty base salary of $20,560 is an average salary for regular university faculty currently teaching at University College. The derivation of this figure is also explained in the appendix.

[3]Estimates for several items such as instructional supplies or office expenses represent standard "best guesses" for University College operations.

[4]The classroom rental figure of $20 per course is probably low. However, it is assumed that the university will not have any permanent facilities, but instead will contract for the temporary use of rooms in a local school, church, library, or business. It is also assumed that some space will be donated by area businesses to facilitate the enrollment of their employees in the courses. The estimated rent for local offices is based on some of those same assumptions.

[5]Telephone service cost estimates are based on a daytime rate for a collect, operator assisted call from approximately 75 miles away. If the average call is ten minutes long, the cost is $4.18 per call. Assuming one call per student and a Model I enrollment level of 18, the phone bill is $75 for one course. Under Model II enrollment levels the cost is $150 per course. These costs could be lowered by 30% if the calls were made at night (or doubled if the calls were person-to-person). According to the university's telecommunications office, an "800" telephone line is not feasible.

[6]Cost estimates for brochures assume mailings to potential university students in four area communities (e.g. Watertown, Fulton, Oswego, Oneida). Brochures are four-paged newsprint. Other advertising costs cover radio and newspaper spots in each community. These expenses are assumed to be similar for all four instructional systems.

already been borne by the university over the time it has employed the faculty member.)

Operating costs - instruction. This category includes all costs which recur every time a course is offered. All personnel costs are based on current University College and Syracuse University figures. No consideration is given to paying faculty on an overload basis but the dislocation allowance does represent a financial incentive for faculty to teach off-campus courses. Under different delivery systems, some of the other items may be costed against administrative rather than instructional operating costs. For example, under Live Lecture, classroom rental costs recur on a course-by-course basis since classroom space can be rented from local institutions on the basis of actual demand. Two of the other systems, however, require permanent facilities to be maintained by the university and the facility rental appears under administration since the cost recurs on a yearly rather than per-course basis.

A unique characteristic of Live Lecture's instructional operating cost is its rate of recurrence. At a given enrollment level, Live Lecture's instructional costs recur two to five times faster than the equivalent costs of other systems. This is because the Live Lecture system's instructors can only teach one class at a time (either on-campus or at one of the off-campus locations) while the other systems allow instructors to teach both on- and off-campus students simultaneously. This fact is reflected in the Model I and Model II projections of average class size which determine the number of courses being offered at a given enrollment level, and thus, the rate at which the instructional costs recur.

Operating costs - administration. All expenditures under this category recur on a yearly basis no matter how many courses are being offered, or what the enrollment is. (This assumption might not hold under extreme enrollment fluctuations, but for these comparisons this category will be treated as a fixed cost.) Costs are included here for off-campus offices and part-time representatives which function as the university's "embassies" in the local communities and exist independently of actual course offerings. The advertising expenditures are based on estimates made by University College's public relations office.

Every system includes a line item for administrative office space although no expenditure is charged against the systems. This item is included to highlight the assumption that the delivery systems will be able to make some use of existing university facilities at no direct cost to the continuing education program. Each delivery system employs varying amounts of university office and instructional space but no attempt has been made to cost the value of that space.

Interactive Instructional Television

A cost breakdown of the Interactive Instructional Television system is presented in Table 5. The comments that were made about the costs of the Live Lecture system generally explain most of the costs here as well. Aside from additional personnel needed to run the system and a different rate for recurring instructional costs, the only major expenditure change is the presence of investment and production costs.

Investment and production costs. This system requires a large capital investment for television and "talk-back" transmission and reception equipment. The estimated expenditures are quite accurate (within ± 10%) as they are based on the actual experience of Genesys Systems with several similar installations. Specific cost data for this kind of system is presented in Morris (1974) and that data was updated (as of Spring, 1976) in personal conversations with Albert Morris, the president of Genesys Systems.

The total capital investment is treated here as a fixed, non-recurring cost with two qualifications. First, this expenditure is not assigned solely to the first year's costs, but is amortized over the ten year planning period. That is, the initial investment depreciates at a rate of 10% per year. An additional "opportunity cost" of 8% per year is charged against the balance of the investment that remains to be "spent" in a given year. This 8% interest charge reflects what the capital could be earning in some alternative use if it had not been tied up in the initial investment since year one. The appendix includes a table used to calculate opportunity costs in making the ten year projections.

The second qualification to the total capital investment cited for this system relates to the instructional capacity of the production facilities. Under Model I class

TABLE 5

COSTS FOR INTERACTIVE INSTRUCTIONAL TELEVISION SYSTEM

Research and Development Costs[1]			
Personnel			
Program administrator (6 mos. at $20,000/year)	$10,000		
Secretary (6 mos. at $6,000/year)	$ 3,000		
Fringe Benefits (at 24.5% of above)	$ 3,185		
Total Personnel Costs:		$ 16,185	
Office Expenses ($1,000 per office/year)		$ 1,000	
Preliminary Study (Market and Risk Analysis, etc.)		$ 20,000	
Total Research and Development Costs:			$ 37,185
Investment and Production Costs[2]			
Capital investment for a two channel production/transmission Facility with radio frequency talk-back. (Estimate includes engineering, equipment, and installation)		$360,000	
Capital investment for four instructional facilities with two classrooms each, (Equipment and installation)		$ 40,000	
Total Investment:			$400,000
Operating Costs - Instruction			
Personnel[3]			
Faculty course instructor (12.5% base salary of $20,560)	$ 2,570		
Fringe Benefits (24.5% of above)	$ 630		
Studio operators ($3.00/hour x 4 hours/week x 15 weeks)	$ 180		
Graduate assistant (For Model I: 1/2 time/course/semester)	$ 800		
Total Personnel Costs:		$ 4,180	
Travel (at $.15/mile)[4]		$ 180	
Instructional Supplies		$ 150	
Telephone Service (for Model I)[5]		$ 301	
Total Instructional Costs Per Course:			$ 4,510
Operating Costs - Administration			
Personnel[3]			
Program administrator	$15,000		
Chief engineer	$12,000		
Technical Assistant	$ 8,000		
Secretary	$ 6,000		
Area representatives (Four 1/2 time employees at $6,000/year)	$12,000		
Fringe Benefits (at 24.5% of above)	$12,985		
Total Personnel Costs:		$ 65,985	
Advertising/Brochures		$ 7,836	
Administration/Production Office Space		$ ----	
Local Classroom/Office Rental[6]		$ 6,000	
Office Expenses (Four Full-time, four part-time)		$ 6,000	
Equipment Repair/ Replacement (10% of Total Investment)		$ 40,000	
Total Administrative Costs Per Year:			$125,821

Explanatory notes on next page.

NOTES TO TABLE 5

[1]The comments on the research and development costs of the Live Lecture System also apply here, except that the $20,000 estimate for the Preliminary Study has a higher confidence. In this system, the Preliminary Study covers more than market analysis - it also includes the attempt to establish agreements with local industries for the support of the system.

[2]These capital investment estimates are based on the actual costs for the recent installation of a two channel interactive instructional television system at the Illinois Institute of Technology. These estimates are also very similar to the costs for Genesys installations at other campuses. The most debatable expense within this estimate is that for the radio-frequency talk-back capability. The costs for this component amount to about 15% of the total capital investment and some schools have avoided this expense by working out a monthly line-rental agreement with the telphone company and substituting a telephone talk-back system. The radio-frequency system has been chosen here since it is less expensive in the long run.

The cost estimates were obtained through conversations with Albert Morris of Genesys Systems and represent 1976 expenditures. A detailed explanation of these costs can be found in Morris, et al, (1974). The costs for the production facility include all engineering and installation costs, equipment for and remodeling of two "studio" classrooms, control rooms, transmission facilities, duplication equipment, and spare parts. The costs for the remote instructional facilities include television sets, audio installations, and reception equipment for two classrooms at each of four different geographic locations.

Opportunity costs of 8% interest a year on a ten year investment will also be included in determining the total cost of this system. The opportunity cost for a capital investment of $400,000 when depreciated over ten years is $176,000. See the table on opportunity costs in the appendix for further information.

[3]Salary costs for all personnel (except hourly help and graduate assistants) are predicted to rise by 5% each year. See the table in the appendix for the predicted salary increases.

The estimate for the graduate assistant is based on Model I enrollments of 36 students per course. Under Model II (with 150 students per course) there would be two graduate assistants assigned to each course, and the cost would be $2,600 per semester.

[4]Travel is computed by assuming two round trips of 150 miles, per remote classroom location, per course.

[5]Telephone service costs (for private student-faculty consultations) are based on the same assumptions used within the Live Lecture System. The estimate is based on an average of two calls per student. For Model II enrollment the cost is $1,254.

[6]Space rental is assumed to be $1,500 per locations, per year, or $6,000 total each year for all locations. This estimate is quite low, but is based on the assumption that at least 1/3-1/2 of the space will be donated by cooperating industries or other local institutions.

size predictions (see Table 3), the production facilities (two studio classrooms) covered by the estimated capital investment could handle no more than 1080 students per semester.

$$\frac{\text{(2 studio classrooms) x (9 hrs/day) x (5 days/week)}}{\text{3 hrs/course}} = 30 \text{ courses}$$

At Model I predictions of 36 students/course:

36 x 30 = 1080 total student enrollments.

This means that the cost of additional facilities should be added to cost projections for enrollment levels over 1000 students (under Model I only). However, this is not done here because it seems highly unlikely that new facilities would be added when the average student density per classroom, per course would only be 7.2 students.

Mediated Self-Instruction

Estimated expenditures for the Mediated Self-Instruction system are given in Table 6. Most of the items and cost estimates follow the same general pattern as has been explained for the first two systems. Some new operating costs have been added to cover the duplication and distribution of course materials. The investment and production costs include expenditures for two studio classrooms, tape duplication facilities (no live transmission), and four off-campus media centers. The costs for these facilities are based on estimates by the university's Video Services and Audio-Visual Services. A detailed list of these capital expenditures is included in the appendix. The total capital investment is amortized over ten years in a manner identical to the capital costs of the Interactive Instructional Television system.

Guided Independent Study

An outline of the costs for this system is given in Table 7. The table shows clearly that Guided Independent Study has some unique research and development costs while otherwise appearing to have a cost structure similar to that of the Live Lecture system. The unique characteristics are explained here.

TABLE 6

COSTS FOR MEDIATED SELF-INSTRUCTION SYSTEM

Research and Development Costs[1]			
Personnel			
Program administrator (6 mos. at $20,000/year)		$10,000	
Secretary (6 mos. at $6,000/year)		$ 3,000	
Fringe Benefits (at 24.5% of above)		$ 3,185	
	Total Personnel Costs:		$16,185
Office Expenses			$ 1,000
Preliminary Study			$20,000
	Total Research and Development Costs:		$37,185
Investment and Production Costs[2]			
Production Facilities and Equipment			
Equipment for two studio classrooms and control rooms		$35,955	
Equipment for master control (duplicating equipment)		$19,280	
Spare parts		$ 5,000	
Room modifications for studio classrooms		$ 2,000	
	Production Facilities Total:		$62,235
Facilities and Equipment for Four Media Centers			
Facility renovation		$ 8,000	
Audio-Visual Equipment		$34,250	
	Media Center Facilities Total:		$42,250
Video Tape Investment Costs (for Model I or II) - $ varies with projected enrollment[3]			
	Total I and P Costs (Excluding Video Tape):		$104,485
Operating Costs-Instruction			
Personnel[4]			
Faculty course instructor (12.5% base salary of $20,560)		$ 2,570	
Fringe Benefits		$ 630	
Studio operators ($3.00/hour x 4 hours/week x 15 weeks)		$ 180	
Graduate assistant (for Model I: 1/2 time/course/semester)		$ 800	
	Total Personnel Costs:		$ 4,180
Miscellaneous[5]			
Materials duplication costs (for Model I with 100 pages/$.10 ea.)		$ 360	
Mailing (for Model I assuming $4.00/student)		$ 144	
Telephone service (for Model I)		$ 451	
	Total:		$ 955
	Total Instructional Costs Per Course:		$ 5,135
Operating Costs-Administration			
Personnel[4]			
Program administrator		$15,000	
Instructional developer/evaluator[6]		$15,000	
Chief engineer		$12,000	
Secretary		$ 6,000	
Messenger		$ 6,000	
Media center personnel (four 1/2 time employees at $6,000/year)		$12,000	
Technical assistant		$ 8,000	
Fringe Benefits (at 24.5% of above)		$18,130	
	Total Personnel Costs:		$92,130
Advertising/Brochures			$ 7,836
Miscellaneous[7]			
Administrative office space (existing U.C. facilities)		$ ----	
Media center facility rental		$ 6,000	
Office expenses (four full-time, and four part-time offices)		$ 6,000	
Travel (messenger service for delivering materials)		$ 6,000	
Equipment repair/replacement (10% of total I and P costs)		$10,448	
	Total:		$28,448
	Total Administrative Costs Per Year:		$128,414

Explanatory notes on next page.

NOTES TO TABLE 6

[1]Costs for research and development activities are based on the same assumption here as they were in the Live Lecture System.

[2]The estimated costs for Production Facilities and Equipment assume the establishment of a classroom production facility similar to that of the Interactive Instructional Television System (except there are no talk-back on live transmission capabilities). Facility renovation costs for the four media centers are quite low since they assume that local schools, libraries, or businesses will donate some resources if the media center is located in their institution. Detailed lists of the estimated costs of both the production and media center facilities are provided in the appendix.

The total capital investment of $104,485 is depreciated over ten years with an opportunity cost of 8% per year totaling $44,000. See opportunity cost table in appendix.

[3]Video tape costs are for hour long 3/4" cassettes. Total costs of video tape is computed with the following formula:

Total = $27.00 a tape x _ courses x 3 hours each week x 5 copies each hour x 4 weeks.

Formula assumes a four week supply of tape before erasure and reuse. Number of courses is determined under Model I or Model II predictions. All tape is replaced after five years.

[4]Salaries for all instructional and administrative personnel (except the hourly help and the graduate assistant) are assumed to increase at the rate of 5% each year. Refer to the appendix for the specific dollar amounts of these increases.

[5]The costs for the graduate assistant and miscellaneous categories are for cost predictions under Model I which assumes 36 students per course. Under Model II, the materials and mailing costs would obviously increase (to accomodate 150 students per course) and there would be two graduate assistants assigned to each course.

[6]The developer/evaluator position has been added since it is assumed that some faculty may have to revise parts of their courses to offer them through this system.

[7]Rental costs for the media centers are assumed to be $1500/per location each year, or $6,000 total. This estimate is quite low, but is based on the assumption that at least 1/3 - 1/2 of the facilities costs will be donated by cooperating industries or local institutions.

Travel costs appear here under the administration category since they represent a continuing expense for maintaining the media centers no matter how many courses are being offered.

Costs for telephone services are based on the same assumptions here as in the Live Lecture System, except that it is assumed that there is an average of three calls per student (due to the lack of direct student-faculty contact). For Model II the cost is $1,881.

TABLE 7

COSTS FOR GUIDED INDEPENDENT STUDY SYSTEM

Research and Development Costs			
Program Planning (Non-recurring costs)[1]			
Personnel			
Program administrator (6 mos. at $20,000/year)	$10,000		
Secretary (6 mos. at $6,000/year)	$ 3,000		
Instructional developer (6 mos. at $15,000/year)	$ 7,500		
Fringe Benefits (at 24.5% of above)	$ 5,023		
Total Personnel Costs:		$25,523	
Office Expenses		$ 1,500	
Preliminary Study (Needs assessment, curriculum planning, etc.)		$20,000	
Total Non-Recurring R&D Costs:			$47,023
Course Development (Recurring costs for each project)[2]			
Personnel			
Faculty course instructor (two months at $20,560/year)	$ 3,427		
Instructional developer (two months at $15,000/year)	$ 2,500		
Evaluator (two months at $15,000/year)	$ 2,500		
Secretary (two months at $6,000/year)	$ 1,000		
Fringe Benefits (at 24.5% of above)	$ 2,310		
Total Personnel Costs:		$11,737	
Office Expenses		$ 700	
Miscellaneous			
Printing/duplication (20,000 pages at $.10/page)	$ 2,000		
Media production costs (slides, tapes, illustrations)	$ 1,000		
Other costs (e.g. field testing; 10% of above costs)	$ 1,544		
Total:		$ 4,544	
Total Recurring R&D Costs for Course Development:			$16,981
Investment And Production Costs			
NONE			
Operating Costs - Instruction			
Personnel[3]			
Faculty course instructor (12.5% base salary of $20,560)	$ 2,570		
Fringe Benefits (at 24.5% of above)	$ 630		
Graduate Assistant (For Model I: 1/2 time/course/semester)	$ 800		
Total Personnel Costs:		$ 4,000	
Materials Duplication Costs (for Model I with 200 pages/$.10 ea.)		$ 720	
Mailing (For Model I at $4.00/student)		$ 144	
Telephone Service (For Model I and four calls/student)		$ 602	
Total Instructional Costs Per Course[4]:			$ 5,466
Operating Costs - Administration			
Personnel[3]			
Program administrator	$15,000		
Instructional developer[5]	$15,000		
Secretary	$ 6,000		
Fringe Benefits	$ 8,820		
Total Personnel Costs:		$44,820	
Advertising/Brochures		$ 7,836	
Miscellaneous			
Administrative office space	$ ----		
Office expenses (five offices)	$ 5,000		
Travel (for counseling, promotional purposes)[6]	$ 3,000		
Total:		$ 8,000	
Total Administrative Costs Per Year:			$60,116

Explanatory notes on next page.

NOTES TO TABLE 7

[1]Costs for the Program Planning segment of these R&D costs are based on the same assumptions as they were in the Live Lecture System. However, an instructional development position has been added to the planning stage.

[2]The other instructional systems have not included costs for course development since the other systems enable the faculty member to teach the same course in basically the same way as he/she always had. Here it is assumed that each course will be designed (or redesigned) from scratch every five years in order that the course may be offered through this system. Over a ten year period, these costs would occur twice for each course.

These development costs may vary widely from course to course and these estimates represent a rough average. These costs do not represent the level of development effort usually involved in the Center for Instructional Development's course projects. It is assumed that the faculty member will be able to prepare his course for delivery over this system without going into full-scale reconsideration of his subject matter and objectives. The costing of instructional improvement efforts is not germane to nature of this study.

[3]Salaries for all instructional and administrative personnel (except the graduate assistant) are assumed to increase at the rate of 5% each year.

For Model II (150 students/course) the following cost estimates apply.

Materials Duplication Costs	$3,000
Mailing	$ 600
Telephone Service	$2,508

[4]The telephone service is computed at the same rate as it was for the Live Lecture System, except that it is assumed that there is an average of four calls per student (due to the lack of direct student-faculty contact).

For Model II, the graduate assistant costs are $2,600/course.

[5]This is an administrative position seperate from the development position listed under course development costs.

[6]Administrative travel is figured at the monthly rate of two, 500 mile trips at $.15/mile and four days at $25 per diem. This cost may be unnecessary, but it is based on the assumption that a university representative will have to travel to various communities to meet with current and potential future students to keep the program running.

Research and development costs are divided into two subcategories: non-recurring costs for program planning and recurring costs for course development. Program planning costs are similar to the usual research and development costs of other delivery systems except that an instructional developer's salary is added to the personnel costs. This instructional developer fills an administrative position responsible for coordinating course development projects.

The course development category is a unique kind of cost category and illustrates the different instructional procedures of this delivery system. None of the other systems have listed costs for the development of course content or teaching methods beyond the costs for faculty salaries: The other systems simply allowed the faculty member to reproduce his existing instructional practices for more students. Under Guided Independent Study, however, the faculty member must change his instructional role and responsibilities from that of a classroom lecture-discussion leader to that of a manager of student learning via independent study materials. The course development costs represent the costs for making this change.

The first time a faculty member is to offer a course to off-campus students, he is paid to spend two months working on the course with a development team (developer, evaluator, secretary). The personnel and materials costs listed on Table 7 are assumed to cover the average expenditures attributable to developing and evaluating the prototype of a single course. Once a particular course has undergone this process it is assumed that it could be offered for a number of years before needing a major revision. Specifically it is assumed that the course development costs would occur twice for each course offered during the ten year planning period. The semester-by-semester expenditures for actually teaching students with the redesigned courses are covered under the instructional operating costs. These operating costs would recur according to the Model I or II course enrollment projections (see Table 3).

This completes the review of the functional nature and size of component costs for each delivery system. This information is relatively meaningless by itself, but can be used to make a variety of predictions and comparisons regarding the system costs and

financial efficiency.

System Cost Comparisons.

"Cost" was selected as one of the six criteria for system comparisons in order to address the issue of affordability: Can the university (and specifically University College) afford to expend the necessary resources required by each system? The question is a relative one. Obviously the university could afford to install any (or all) of the delivery systems it wants. Whether or not it wants to make such an expenditure depends on the perceived (or real) importance of new continuing education programs versus other kinds of expenditures. It is beyond the scope of this study to deal with the issue of whether the university should invest in new continuing education programs as opposed to other kinds of investments, so the issue of affordability is treated here as though it were a simple matter of the relative expensiveness of each system.

The following discussion determines which systems are more or less expensive by comparing them on the size of their initial implementation costs, and on the subsequent long-term expenditures required for operation. The focus here is on the kind and size of expenditures required by each system. The following section, on financial efficiency, will compare unit costs for each system and discuss their ability to generate sufficient tuition income.

Initial Costs. One of the basic pieces of cost information for buying any goods or services is the initial investment, purchase price, or front-end cost. What all these terms refer to is the initial, out-of-pocket cost for purchasing an item prior to that item's providing any return on its investment to the purchaser. In this study the initial cost is the expense to the university for establishing a delivery system up to the point when that system begins to provide revenue to the university. The system which requires the smallest initial investment is likely to be judged more favorably because it ties up less capital and makes starting a new program less risky.

Initial costs were calculated by determining each system's costs up through the first offering of a single course. This cost estimate includes all research and

development costs, investment and production costs (total, not amortized), instructional operating costs for teaching one course, and administrative operating costs for one semester (four months). At this point it is assumed that any of the systems would be ready to operate at full capacity. Table 8 shows the initial cost by category for establishing each system.

Several observations can be drawn from the data in Table 8. First, looking at the total costs for each system, it is obvious that the Live Lecture and Guided Independent Study systems are far less expensive to set-up than either of the other two systems. Second, it is equally obvious that the relative expensiveness of the Interactive Instructional Television and Mediated Self-Instruction systems is due to investment and production costs: most other costs are relatively similar. The relative impact of these investment and production costs can be examined by considering the incremental costs of teaching a second course during that same first semester. The incremental cost would simply be the instructional operating cost (as tabled) for all systems except Guided Independent Study where the recurring development cost of $16,981 must be added for developing a second course. Thus, incremental (or recurring) costs for a second course are quite similar for all systems except Guided Independent Study (and its additional development expense would recur only once every five years for a given course.) This suggests that in spite of the large initial difference in system costs, they may be more equal over long-term operation.

Recurring and non-recurring costs. One way to look at how system costs function over time is to look at the way each cost category contributes to total system cost. Table 9 compares the initial costs against one projection of ten year costs for each of the delivery systems. Each system's cost categories are described in terms of the percentage of total system costs for which they are responsible. Ignoring the fact that recurring costs are not all alike (do not recur at the same rate for all systems or costs categories) it is possible to compare the total of recurring versus non-recurring costs for each system. As shown in the table, the non-recurring costs which appear large in the comparison of initial costs have little impact on total system costs over time.

Table 8

INITIAL COSTS FOR EACH SYSTEM

THROUGH FIRST COURSE OFFERING*

Cost Categories	Delivery Systems			
	Live Lecture	Interactive Instructional Television	Mediated Self-Instruction	Guided Independent Study
Research & Development	$37,185	$37,185	$37,185	$47,023
Course Development	___	___	___	$16,981
Investment & Production	___	$400,000	$106,105	___
Operating Costs - Instruction	$4,633	$4,510	$5,135	$5,466
Operating Costs - Administration (four months)	$18,260	$41,940	$42,805	$20,038
Total Cost	$60,078	$483,635	$191,230	$89,708

* These costs were determined from Tables 4,5,6,&7. Opportunity costs have not been added to the Investment and Production expenses.

Table 9

RECURRING AND NON-RECURRING COMPONENTS OF

TOTAL SYSTEM COSTS: PERCENT OF TOTAL COSTS PER CATEGORY

Cost Categories	Initial Costs Through First Course Offering*				Total Costs for Ten Year Operation With One Thousand Students/Semester**			
	Live Lecture	Interactive Instructional Television	Mediated Self-Instruction	Guided Independent Study	Live Lecture	Interactive Instructional Television	Mediated Self-Instruction	Guided Independent Study
Research and Development	62%	7%	19%	52%	1%	1%	1%	1%
Course Development	----	----	----	19%	----	----	----	20%
Investment & Production	----	83%	56%	----	----	11%	5%	----
Operating Costs - Instruction	8%	1%	3%	6%	90%	61%	67%	65%
Operating Costs - Administration	30%	9%	22%	23%	9%	27%	27%	14%
Total Non-recurring Costs	62%	90%	75%	52%	1%	12%	6%	1%
Total Recurring Costs	38%	10%	25%	48%	99%	88%	94%	99%

* Based on cost data from Table 8

** Based on cost data from Table 11 under Model I predictions for average class size.

(Model I and II predictions are used to predict recurring costs using estimates of minimum and maximum average course enrollments to predict the number of courses offered at different enrollment levels. Model I predictions assume a minmum enrollment of 18 students/course for Live Lecture and 36 students/ course for the other three systems. Model II predictions assume a maximum average enrollment of 30 students/course for Live Lecture and 150 students/course for all others. See Table 3, page 44 for further information.)

Conclusion

This section of the report has reviewed the development of a cost model and presented specific cost estimates for each delivery system. The initial costs of establishing each system were compared and the Live Lecture system was judged as least expensive followed closely by Guided Independent Study. However, comparisons of recurring and non-recurring cost components of each system suggest that these two systems may not be the least expensive over time. The next section uses the data developed here to examine the long-term performance of the systems.

Financial Efficiency

The university is obviously concerned that any new program should be able to pay for itself and perhaps produce a return on its initial investment of university resources. At issue here is the financial efficiency of a program: the ratio of resources expended (input to the program) compared to tuition generated (output from the program) as the result of a program's existence. This criterion compares the delivery systems in terms of their cost per student over a ten ear period at given levels of average enrollment. The cost per student figure can then be compared against tuition fees to judge the relative efficiency of the systems.

The cost model and system cost data presented in the previous section provide the basis for predicting system costs over time. An example of the computations required to determine the unit cost for Mediated Self-Instruction is presented in Appendix B. Similar computations were performed for all four systems. Remember that "Model I" and "Model II" figures differ in their assumptions about average class size and produce different estimates for the number of courses being taught at a given semester enrollment level. Model I predictions profice cost estimates for conditions where there are a large number of courses being taught with minimum average per-course enrollments. Model II predictions give costs for maximum average per-course enrollments and fewer courses being offered. Table 10 shows both the total costs and unit costs for each system, at different enrollment levels, and under either Model I or Model II predictions. The unit

Table 10

UNIT AND TOTAL COSTS FOR EACH SYSTEM OVER TEN YEARS

Enrollment Per Semester	Prediction Model	Live Lecture		Interactive Instructional Television		Mediated Self-Instruction		Guided Independent Study	
		Total	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total	Unit Cost
100	I	$1,244,422	$622	$2,298,041	$1149	$1,638,922	$819	$1,097,783	$549
	II	$1,012,559	$506	$2,150,237	$1075	$1,513,731	$757	$932,567	$466
500	I	$3,634,074	$363	$3,549,033	$355	$2,806,220	$281	$2,711,323	$271
	II	$2,475,062	$248	$2,536,090	$254	$1,903,033	$190	$1,488,717	$149
1000	I	$6,626,522	$331	$5,115,591	$255	$4,267,973	$213	$4,731,883	$237
	II	$4,286,820	$214	$3,106,480	$155	$2,478,524	$124	$2,310,848	$116
1500	I	$9,618,970	$321	$6,682,148	$223	$5,729,724	$191	$6,752,441	$225
	II	$6,109,491	$204	$3,660,095	$122	$3,027,089	$101	$3,108,803	$104
2000	I	$12,600,653	$315	$8,248,706	$206	$7,191,476	$180	$8,773,001	$219
	II	$7,932,162	$198	$4,213,710	$105	$3,582,354	$90	$3,906,757	$98
2500	I	$15,593,100	$312	$9,803,994	$196	$8,642,712	$172	$10,779,025	$215.
	II	$9,743,919	$195	$4,784,100	$96	$4,154,444	$83	$4,728,889	$95

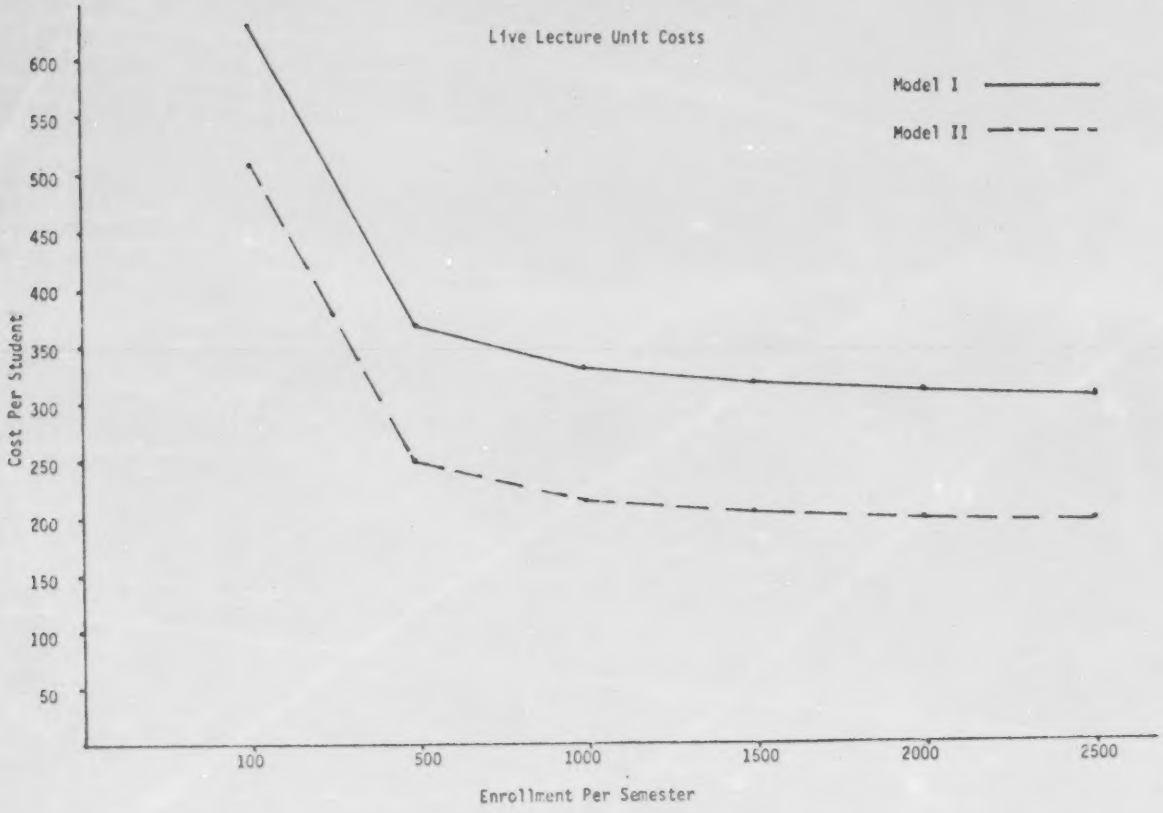
cost data is graphed for each system in Figure 2.

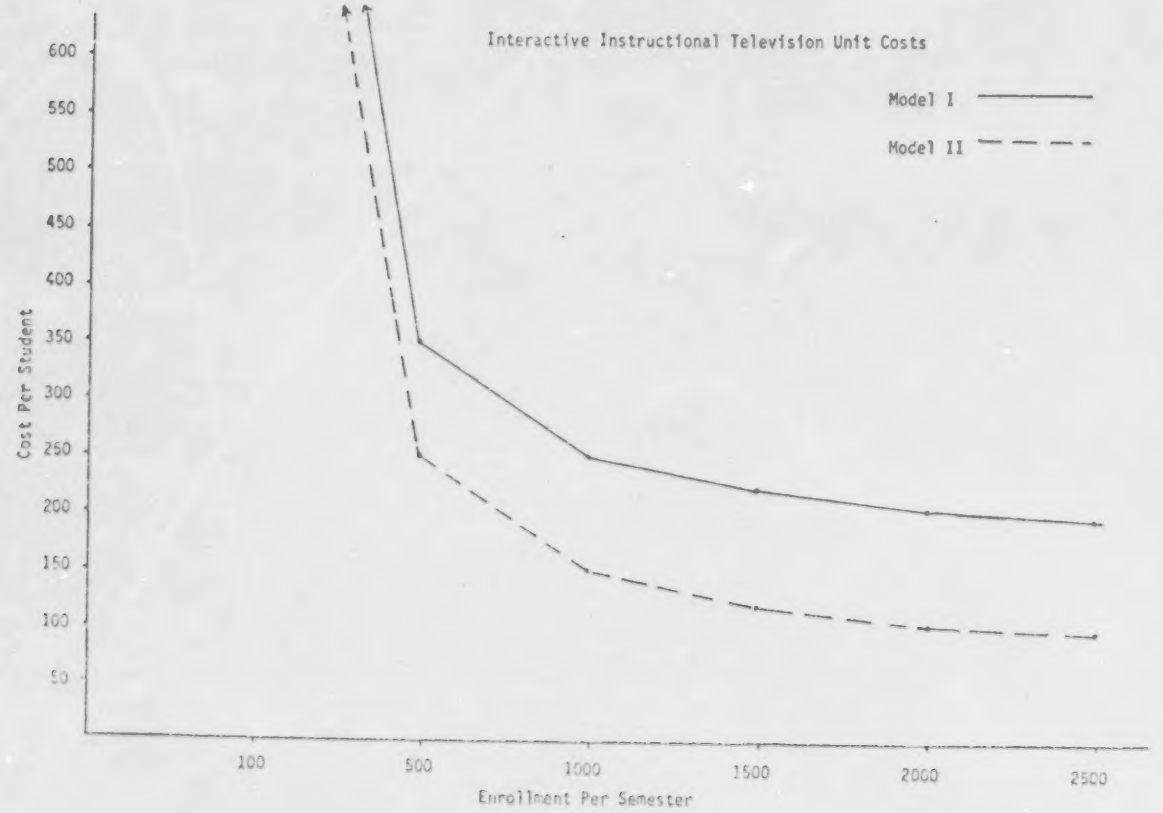
Several observations can be drawn from the cost data in Table 10. First, there is a major reduction in unit costs for all systems when the average enrollment level changes from 100 to 500 students per semester. This is illustrated quite clearly in Figure 2. After this initial reduction, the unit costs decrease more slowly as enrollments increase. For example, at an enrollment level of 2500, the unit costs for Guided Independent Study have only been reduced by 21% over what they were at an enrollment level of 500. The unit costs for Interactive Instructional Television, however, do drop more rapidly: They are 45% lower at 2500 than at 500 students per semester.

A second observation that can be based on this data is the relatively small difference in unit costs between Model I and Model II predictions of course enrollment patterns. This is somewhat surprising since from two to four times as many courses are offered under Model I as are offered under Model II predictions for a given system. This suggests that the delivery systems may not need large per-course enrollments to be economical. They simply need consistent enrollments equal to some minimum level such as the 18 students per classroom for Live Lecture and 36 students per course (total for all locations) for other systems that were assumed here. Both of these observations on the relationship of enrollment patterns to system costs point out the need for further and more detailed study of system costs under different levels of use.

A third and final set of observations from the cost data relates to the comparative expensiveness of the systems. Model I unit costs for all four systems are compared in Figure 3 and Model II cost comparisons are presented in Figure 4. For enrollments in excess of 500 students per semester, the Live Lecture system is decidedly more expensive than any of the other three systems. The <u>least</u> expensive system varies somewhat as enrollments increase. At lower enrollment levels, Guided Independent Study is the least expensive system, but Mediated Self-Instruction becomes slightly more economical at higher levels. Perhaps the most significant conclusion is that there is very little difference in unit costs between either of these systems, or Interactive Instructional

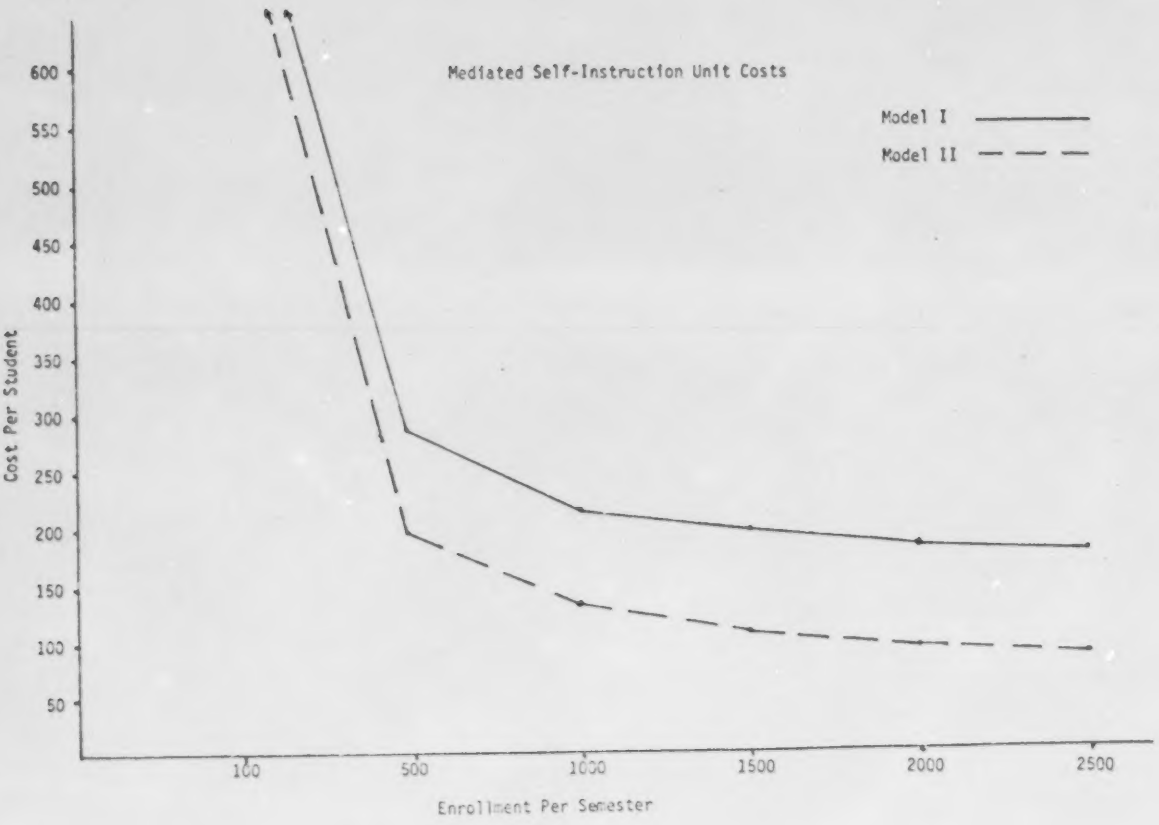
SYSTEM UNIT COSTS UNDER MODEL I and II





SYSTEM UNIT COSTS UNDER MODEL I and II

Continued



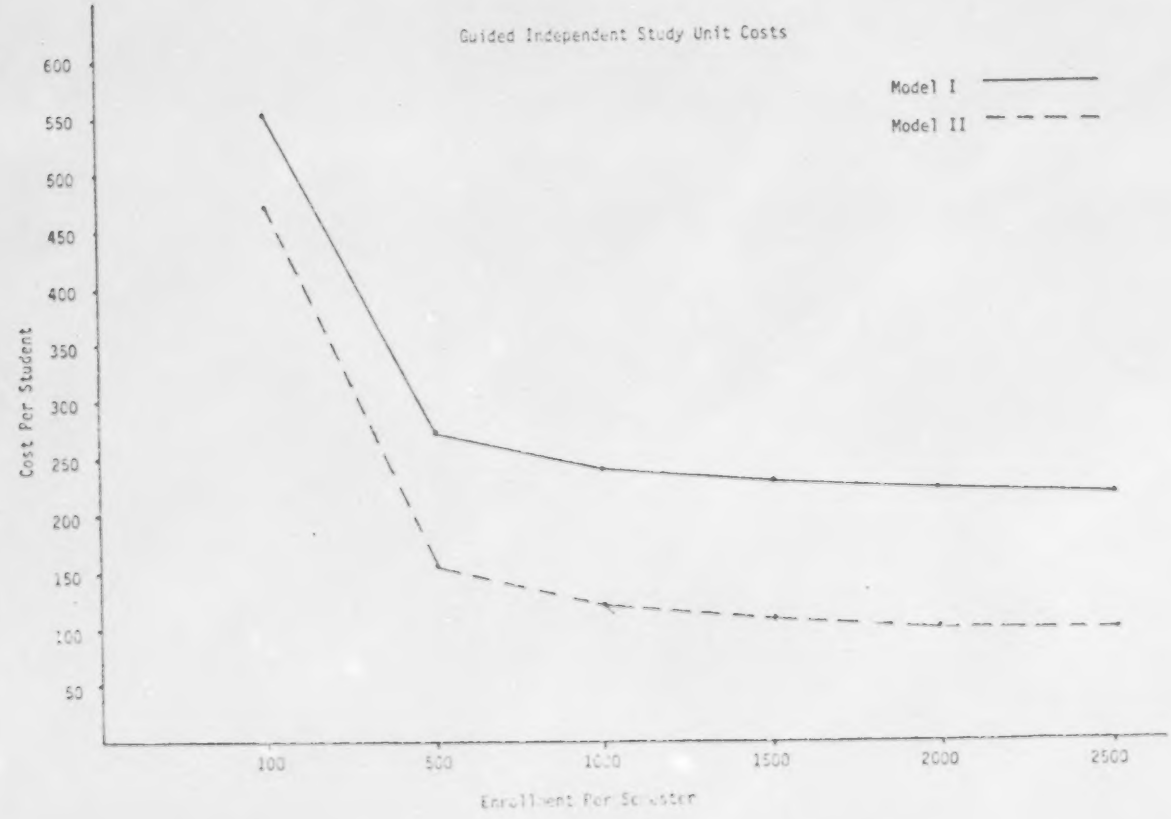


Figure 3

MODEL I UNIT COST COMPARISON

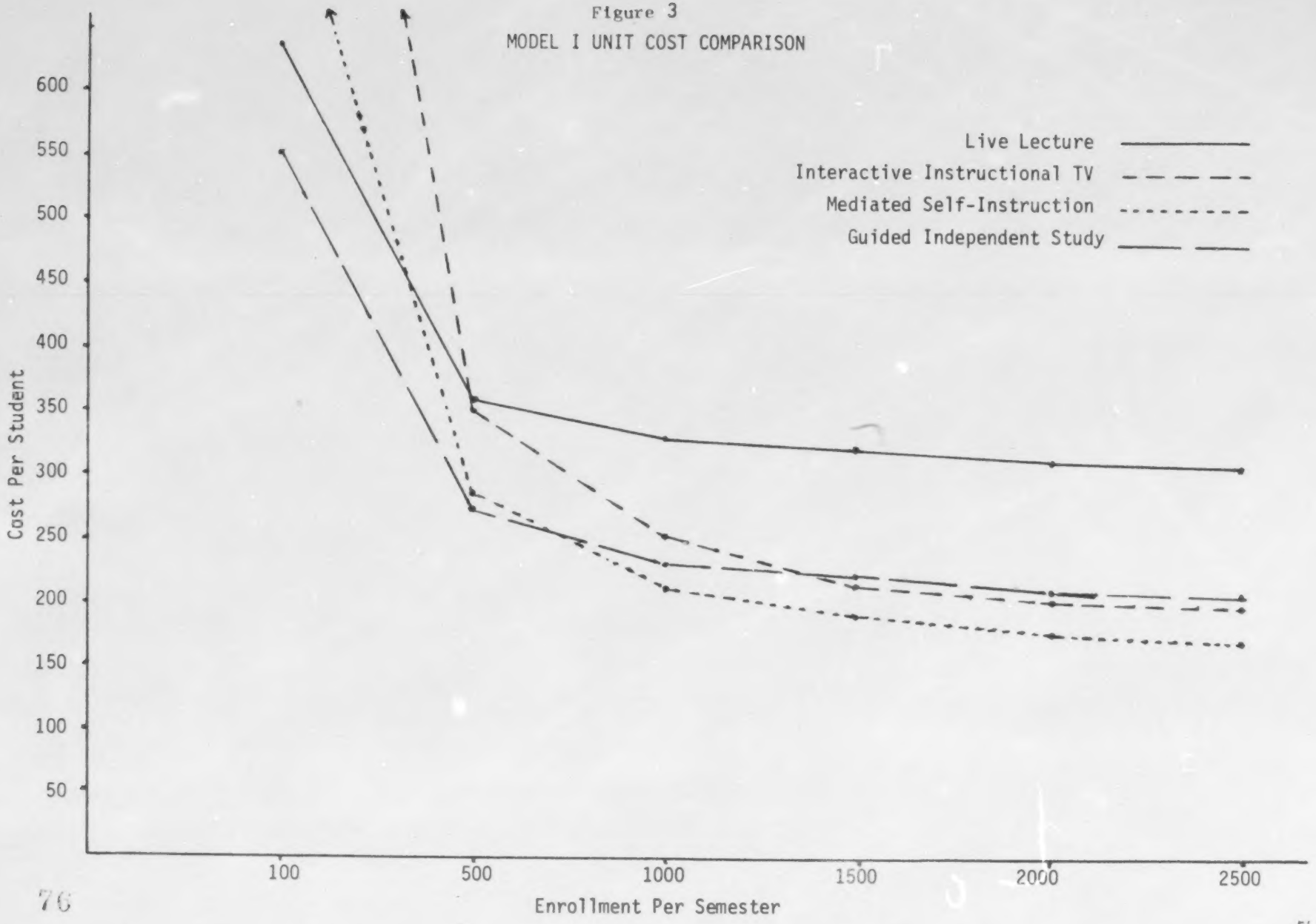
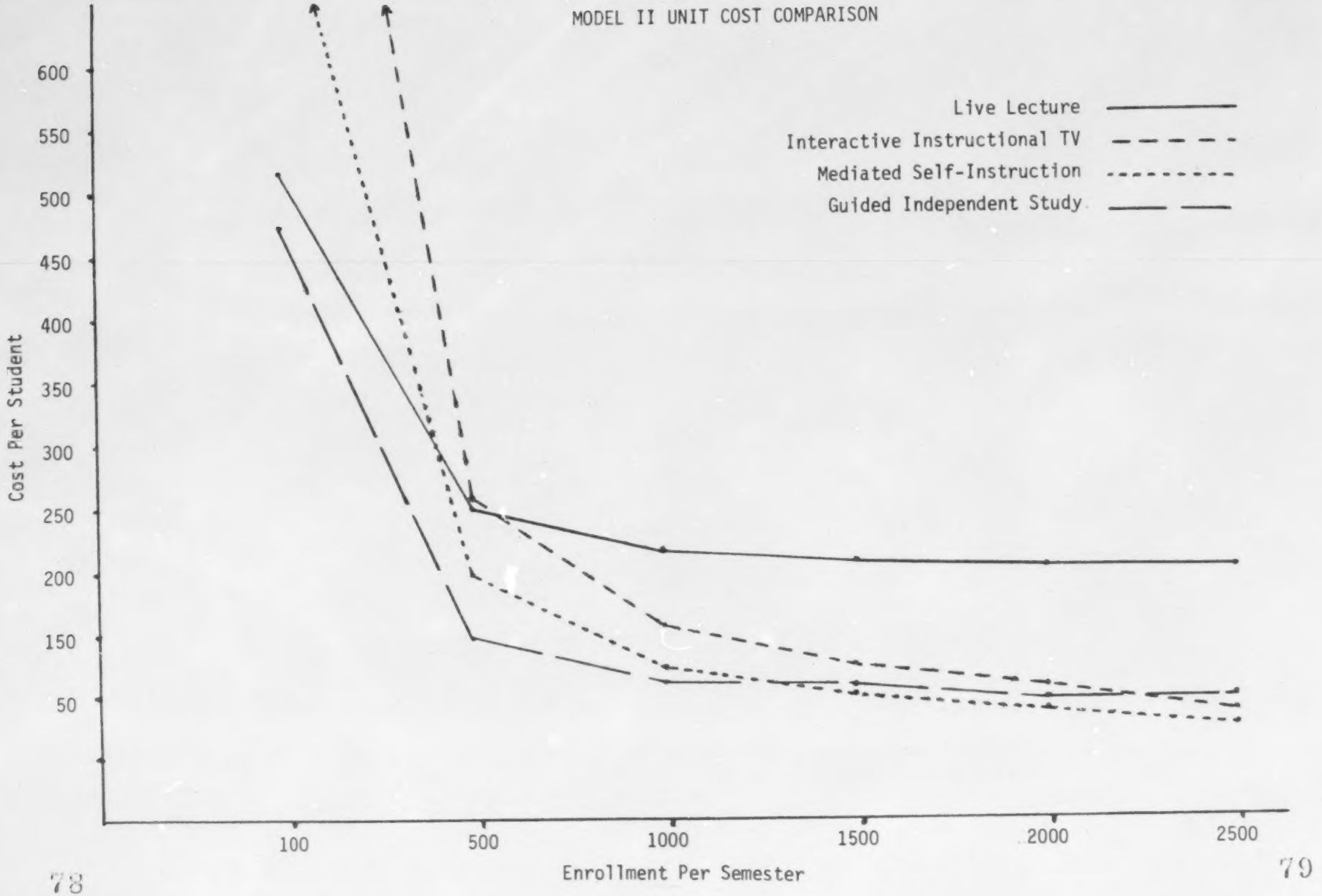


Figure 4

MODEL II UNIT COST COMPARISON



Television, at enrollment levels over 1000 students per semester.[10] This suggests that any reasonable approach (or combination of approaches) to the delivery of off-campus courses is likely to be similar in financial efficiency as long as it does not rely on face-to-face instruction.

The unit cost curves presented in Figures 3 and 4 also facilitate a simple determination of each system's financial efficiency. For ease in computation it is assumed that all courses are three credits and that tuition is $100 a credit hour ($300 a course). Since the unit cost curves show average per student costs per course, a line can be drawn across the graph at $300 and a system is financially efficient when it is operating at a level below that line. Under Model I conditions, only Mediated Self-Instruction and Guided Independent Study can operate efficiently at an enrollment level of 500 students a semester. Interactive Instructional Television is able to pay for itself if enrollments average about 800 students a semester or higher. According to these Model I projections, Live Lecture is never able to break even. Under Model II conditions, all systems "break even" at enrollment levels above 300-400 students a semester.

These comparisons show some of the conditions under which a system becomes financially efficient. In "real life" there are many more variables which can effect the financial characteristics of a system's performance. For example, actual course enrollments will never follow the neat patterns of these projections: Some courses may have to be offered even with low enrollments. More serious than changing course enrollments is the high likelihood of widely varying enrollment levels per semester. Even if there is a high continuing demand for this kind of educational service, the research on innovation adoption suggests that initial enrollments will be low and gradually increase over time. Unfortunately, this means that the tuition income pattern is opposite

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[10] In the initial explanation of the costs for Interactive Instructional Television it was mentioned that additional facilities would be needed to handle enrollments above 1000 students under Model I conditions. It was argued that it would be unrealistic to add these facilities, but if they were added, their cost would amount to 7% or less of the total cost and would have little effect on the overall unit cost picture.

to the expenditure pattern for delivery systems which require a high initial investment (see Table 8). Once again the implication of these comments is that further study should be given to the characteristics of the systems' costs: Particularly in conjunction with specific data on the market being served.

Given this study's information and assumptions, the overall judgement of the financial efficiency of these systems must be generally favorable. Provided that enrollments average near or over 1000 students a semester and that course offering and class size patterns are closer to Model II than to Model I conditions, all systems should at least break even over a ten year period. Mediated Self-Instruction and Guided Independent Study have the lowest unit costs and would be more likely than other systems to return a "profit" to the university at any enrollment level above 500 students a semester. The only exception to these favorable conclusions applies to the Live Lecture system under Model I assumptions. With an average per-course enrollment of 18 students the Live Lecture system has unit costs in excess of $300 for all projections of semester enrollments.

Adoptability

The sixth and last criterion for judging the advantages of the four systems concerns the relative ease of their adoption into the University College setting. This criterion comes last in these comparisons because it represents what is logically one of the last decisions in the process of determining the proper solution to a problem. That is, after the best solution has been determined comes the consideration of how that solution should be implemented. Of specific concern here is whether or not there are characteristics of the four delivery systems which will influence the likelihood of their acceptance as innovations in the university's continuing education activities.

Rogers and Shoemaker (1971) have conducted a major review of the research on factors affecting the adoption (or non-adoption) of innovations. They have concluded that it is the attributes of an innovation as perceived by its potential adopters that really determines the rate or ease of adoption of an innovation within a given social

setting. Five interrelated but conceptually distinct attributes have been identified by Rogers and Shoemaker for use in predicting the adoptability of innovations. These five attributes are (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. The implications of these attributes for each delivery system is described below. These attributes are only considered from the viewpoint of faculty and administrators. When market research or needs assessment studies are conducted on the potential student clientele for these systems, the students' perceptions of the systems as potential adopters should also be examined.

Relative advantage. In Rogers and Shoemaker's words, relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes (1971, p. 138)." The relative advantage of one thing over another has to do with perceptions of potential profitability, low initial cost, lower perceived risk, savings in time or effort, and the immediacy of the rewards gained. Not surprisingly, Rogers and Shoemaker find a positive relationship between adopters' perceptions of relative advantage and the rate of adoption. Thus, the delivery system perceived as most advantageous would be the one most easily and quickly adopted by faculty and administrators at the university.

The concept of relative advantage is closely related to the concept of acceptability and the conclusions on the relative acceptability of the delivery systems to the faculty will be used as an indication of their perceived advantages. Therefore, the Live Lecture system is interpreted as being perceived by the faculty as the most advantageous system of the four.

More work could be done to better understand and define the perceived advantages of each system and their implications for adoption. First, data should be gathered on administrators' perceptions of the systems. It is possible that university administrators would base their judgements of relative advantage on different issues than the faculty, and would choose a system other than Live Lecture as being most advantageous. Second, when the faculty were surveyed, no mention was made of providing any incentives to gain their participation. The effect of adding incentives to the comparison of the system's

perceived desirability is not known. Third, and finally, if more was known about the specific components of the faculty's perception of advantages and disadvantages, perhaps the systems could be easily modified to address those components and significantly alter their perceptions of the systems. To determine whether there might be any definable components within the faculty responses to the questionnaire, a factor analysis of the item responses has been conducted. The results of that analysis were not ready for inclusion in this report and will appear in the appendix on the faculty survey.

Compatibility. The compatibility of in innovation is the degree to which the potential adopters perceive the innovation as consistent with their existing values, past experiences, or current needs. Evans (1967) investigated the compatibility of instructional television with university faculty and administrators. He concluded that the lack of perceived compatibility contributed to the slow rate of adoption of instructional television in higher education.

> Most of our respondents saw the innovation as wholly inconsistent with the university climate as they perceived it. To them ITV either lacked or failed to contribute to the important ingredients of personal contact between teachers and students, feedback from students, and proper supervision of students, all of which they considered essential to the learning process. (p. 17)

Although the faculty questionnaire employed in this study did not address this issue directly, it seems quite likely that this university's faculty have opinions similar to those in Evans' study. Particular evidence of their feelings in this area can be found in their voluntary comments on the questionnaire (see the appendix). The obvious conclusion is that of the four systems, Live Lecture is the only system viewed as being truly compatible with the values and interests of the faculty. It is possible, however, that these perceptions of relative compatibility could be changed. After all, spending several hours traveling to and from class each week is not exactly compatible with the faculty member's image of their responsibilities.

Trialability. The trialability of an innovation is the ease with which it can be experimented with and adopted on a trial basis. According to Rogers and Shoemaker, "the trialability of an innovation, as perceived by members of a social system, is

positibely related to its rate of adoption (1971, p. 155)." Once again, there are no direct measures of how this university's faculty and administrators perceive this attribute of the delivery systems, but the outward structure of the systems would suggest that Live Lecture would be seen as most trialable. Guided Independent Study might place a poor second on the trialability continuum. The other two systems require too large an initial equipment investment to be perceived as trialable in a real sense.[11]

Observability. The attribute of observability is the degree to which the results of an innovation are visible and communicable to others. An innovation can be adopted faster and easier if the later adopters are able to easily observe the benefits accruing to earlier adoptors. It is difficult to discuss faculty perceptions of this attribute of the delivery systems since it is not clear what, if any, benefits are perceived relative to the use of these systems. If the use of one or several of these systems could be positively connected to favorable promotion and tenure decisions, then there would be a strong and observable benefit operating to influence adoption. The Center for Instructional Development has had some success with demonstrating the benefits of its services in this fashion.

Summary. Based on Rogers and Shoemaker's definition of the perceived attributes of an innovation which affect its adoption, the Live Lecture system can be judged as the most easily adopted approach. This finding is hardly surprising and reinforces the conclusions of the acceptability criterion. There are indications, however, that other systems would become more adoptable through careful modifications and the addition of incentives.

This criterion has only considered adoptability relative to the personal views of the adoptors. It has not touched upon such topics as the structural characteristics of the university's organization, intra-university communication problems, and a variety of

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[11] This is not to say that these systems are not, in fact, trialable. Guided Independent Study could use the experience and materials of Project Advance in conducting a pilot operation, and there is probably enough media equipment available on campus to conduct a limited trial of the other two systems.

political issues all of which are likely to have a determining influence on the nature of any new continuing education programs.[12] These issues, along with the needs of the student clientele, should be dealt with in subsequent studies. This completes the comparisons of the four delivery systems on the six criteria chosen for this study.

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[12] See Lindquist (1974) for a review of issues relevant to academic reform in University College's setting.

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to explore whether there might be a new configuration of the university's instructional resources that would enable University College to reach more continuing education students. This "new configuration" was defined as some form of instructional delivery system and a goal was developed for what would constitute a successful delivery system in this situation.

> The delivery system should promote the more efficient use of the university's existing instructional resources by expanding course enrollments with new students previously unable to attend on-campus offerings.

This goal was further defined in terms of performance requirements for the delivery systems and the purpose of this evaluation was specifically defined as determining which of the proposed delivery systems would be most likely to meet the goal and its requirements.

The evaluation of four alternative delivery systems was conducted within a framework of six cost and effectiveness criteria for comparing system characteristics. A summary of the findings from this evaluation is presented in the Cost-Effectiveness Comparison Matrix of Table 11. This matrix has been developed in an attempt to provide a picture of the overall "best" system relative to the stated goal. Unfortunately, the comparison is not that simple: No one system is the consistent choice across all criteria.

Drawing any conclusions about the best system is complicated by the fact that not all of the criteria are equally important. It seems likely that a system would have to at least perform well in the areas of marketability, adoptability, and financial efficiency to be considered a viable choice (no matter how well it performs on other criteria). Of these three areas, financial efficiency was the only one to receive even minimally adequate consideration here. Other studies are needed to gather information on the size and nature of the potential student clientele, and on the likelihood of securing political support and intra-institutional cooperation for each of the systems.

TABLE 11

COST-EFFECTIVENESS COMPARISON MATRIX

Criterion	Delivery Systems Live Lecture	Interactive Instructional Television	Mediated Self-Instruction	Guided Independent Study
Instructional Effectiveness				
Convenience	Least convenient. Highly structured, low curriculum flexibility.	Relatively inconvenient due to time-place structure.	Fairly convenient system for student use.	The most convenient system for students to use.
Instructional Adequacy	Highly appropriate for adult students.	Courses taught under these two systems should result in student achievement data similar to the other two systems; However, these systems are likely to be inferior in their ability to motivate, direct, and adapt to the needs of individual adult learners.		Highly appropriate for adult students.
Desirability	Quite desirable to students who value the social interaction it provides.	Less desirable than Live Lecture.	Least desirable system to most students	Quite desirable to students who value its efficiency as a teaching-learning system.
Acceptability	Significantly more acceptable to faculty than any other arrangement.	Second choice of most faculty.	Least acceptable teaching arrangement to most faculty.	Second choice of many faculty
Utility				
Uniqueness and Marketability	Each system is uniquely suited to meeting specific requirements of different teaching-learning situations. Market and/or needs assessment data must be gathered to determine the nature of the potential clientele for courses offered under each (or any) of these systems.			
Exportability	Provides educational services which are fairly exportable and highly adaptable to new situations.	These systems provide services which are relatively harder to export and adapt to new and temporary settings.		Provides the most exportable educational services.
Dependability	Easiest system to install and operate.	Each of these three systems has characteristic problems with its installation and/or operation. Guided Independent Study may have some slight advantage over the other two.		

TABLE 11 COST-EFFECTIVENESS COMPARISON MATRIX Continued

Criterion	Live Lecture	Interactive Instructional Television	Mediated Self-Instruction	Guided Independent Study
Costs				
Initial Cost to Install System (Up to first course offering)	$60,078	$483,635	$191,230	$89,708
Inremental Cost of Offering a Second Course	$4,633	$4,510	$5,135	$22,447
Financial Efficiency				
Ten Year Operation Costs Under Model I				
At 500 Students/Semester				
Total	$3,634,074	$3,549,033	$2,806,220	$2,711,323
Unit Cost	$363	$355	$281	$271
At 1000 Students/Semester				
Total	$6,626,522	$5,115,591	$4,267,973	$4,731,883
Unit Cost	$331	$255	$213	$237
Ten Year Operation Costs Under Model II				
At 500 Students/Semester				
Total	$2,475,062	$2,536,090	$1,903,033	$1,488,717
Unit Cost	$248	$254	$190	$149
At 1000 Students/Semester				
Total	$4,286,820	$3,106,480	$2,478,524	$2,310,848
Unit Cost	$214	$155	$124	$116
Adoptability	As an innovation, this system is the most adoptable when considering the views of faculty and administrators	These three systems are much less adoptable overall. They differ somewhat in their potential adoptability: Under some circumstances they may equal Live Lecture in adoptability.		

-11-

Without information in these areas it is impossible to single out one system as the most appropriate to University College's situation.

Given these limitations, what conclusions can be drawn from the comparisons of the cost-effectiveness matrix? First, it is obvious that the systems vary somewhat in their capabilities. What is particularly interesting is the fact that the extreme approaches seem to be the best on most criteria. That is, Live Lecture and Guided Independent Study are usually either the first or second best system on any comparison where there are clear differences between systems: The exception being that Live Lecture comes in last on financial efficiency. The other two delivery systems cannot be judged as outstanding on any dimension. Perhaps this is due to the fact that Interactive Instructional Television and Mediated Self-Instruction are trying to imitate Live Lecture conditions rather than provide a unique educational setting.

If this conclusion is meaningful, it has some implications for the future design of any delivery system. It seems likely that the ultimate choice will be a delivery system that represents a combination and compromise between the different strengths and weaknesses of several approaches. The lesson from this study is that when the ultimate choice is made, it should be carefully examined to insure that it is not just a weak imitation of the advantages of other systems but has some real advantages of its own.

A second and related observation is that the two systems which seem to perform best take the most liberal interpretation of the system goal of promoting "a more efficient use of the university's existing instructional resources." The Live Lecture and Guided Independent Study systems, while based on existing faculty resources, do require additional effort from those faculty who offer courses over these systems. In particular, the Live Lecture system may not be a realistic alternative almost by definition since it requires faculty to duplicate their efforts for each class taught. The Guided Independent Study system while ultimately requiring less teaching effort per student does require some major changes in the faculty's instructional repertoire. Whether it is worth the extra faculty effort required to offer courses through Live Lecture or

Guided Independent Study will depend on the requirements and size of the student clientele. Certainly this comparison does not show that the television-based systems are so different that they might not be the best choices given a trade-off between student needs and available faculty resources. In fact, to this researcher, the study's most striking finding is the relative similarity of the systems across many of the criteria.

Recommendations. Two kinds of recommendations are offered here: those concerning the use of this report, and those relating to additional activities required to make decisions in this planning area. As for the use of this report, it was written for use as a discussion paper in initial planning deliberations. It is so early in the planning process that there are few, if any, firm notions as to what direction University College may take in the future expansion of its programs. If it now seems wise to continue planning this kind of expansion, then hopefully this paper provides an outline of the essential issues in discussions of alternative futures. With this in mind. it is recommended that this paper be given to a review panel to gather reactions and begin consideration of specific options for new continuing education services. This review panel should consist of experts in continuing and adult education, external degree programs, and instructional technology, as well as representatives from academic program and administrative areas. One or two half-day conferences would be needed to bring these people together to define and explore the realistic alternatives.

In addition to recommending how this study should be used, suggestions must also be made as to the nature of further analyses and investigations that should be conducted to provide further support for planning deliberations. First, an effort should be made to expand the findings of this study by reanalyzing the cost information (a sensitivity analysis of the underlying assumptions) and constructing new unit cost projections under different enrollment predictions. Second, the cost and effectiveness findings should be reexamined to determine the feasibility of

delivery systems which represent various combinations of the systems considered here. The most realistic alternative may borrow characteristics from all four systems. Third, market research and needs assessment studies should be conducted to determine the potential size, nature, and location of the student clientele for continuing education services. Finally, another study should be conducted to determine the possibilities of outside funding from the public or private sectors for new educational services. When these various investigations are completed it will be easier to determine whether the university should expand its programs as well as what those programs or delivery systems might look like. Hopefully, this study and its report have set the right stage for further activities.

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APPENDIX A

Survey of Faculty Attitudes Towards the Delivery Systems

SYRACUSE UNIVERSITY

SCHOOL OF MANAGEMENT | Masters in Business Administration Program
Master of Science in Accounting

CHARLES A. MCINTOSH, JR.
ASSISTANT DEAN—DIRECTOR, MASTERS PROGRAMS

101 SLOCUM HALL | SYRACUSE, NEW YORK 13210
TELEPHONE 315 | 423-3850, 4327, 3006

April 5, 1976

Dear Professor Last-Name,

You are being asked to participate in a study designed to help the University look at the feasibility of various instructional arrangements for continuing education programs. In recent years, many experts have proposed different ways to make it easier for working adults to continue their college educations. Such proposals are often concerned with various systems for delivering courses to students in remote areas. These instructional delivery systems may involve faculty traveling to off-campus classrooms or using media to "send" the instruction to the student. University College, the University's continuing education college, is interested in studying the practicality of some of these approaches. As a faculty member, you are one of the best judges of the appropriateness of these systems.

On the following pages you are asked to give your opinions on four different systems for providing regular college courses to adult students living in the central New York area. Your responses to this questionnaire will be combined with other information on the costs and effectiveness of these systems to arrive at an overall evaluation of the strengths and weaknesses of each approach. Although University College is not planning any immediate changes in its current operations, the information from this study will help it plan for the future.

It should take you about twenty minutes to complete this questionnaire. Please be as candid as possible; your responses will be completely anonymous once you detach this cover letter. Please place the completed forms in the attached envelope and mail it by Friday, April 23. If you have any questions, contact Richard Lent at 423-3153 or 423-4571.

Your help will be greatly appreciated.

Sincerely,

C.A. McIntosh

Charles A. McIntosh, Jr.
Assistant Dean

DIRECTIONS

Four different instructional delivery systems are presented on the following pages: Live Lecture, Interactive Instructional Television, Mediated Self-Instruction, and Guided Independent Study. Each system is intended as a way to make regular university courses more accessible to residents of such central New York communities as Watertown, Fulton, or Oneida.

Each of the next four pages begins with a brief description of how one of these alternative systems would operate. This description is followed by a set of twenty statements. Consider each statement as a statement of opinion. Then decide to what extent you agree or disagree with that opinion about the specific system described on that page. Indicate your reaction to each statement by circling the abbreviation that corresponds most closely with your own opinion.

SA = Strongly Agree A = Agree N = Neutral D = Disagree SD = Strongly Disagree

EXAMPLE:

1 (SA) A N D SD Syracuse could use more sunshine.
(I think we would all strongly agree with that.)

On the last page of the survey there are some brief questions that ask you to make some comparisons of the four systems and to fill in demographic data. Complete all of the items in the order given, and please give your honest reactions. If an item seems inappropriately stated for your particular case, answer as best you can. Write in any explanations if you think they will clarify your answers.

PLEASE COMPLETE THIS QUESTIONNAIRE AND MAIL IT IN THE ATTACHED ENVELOPE BY FRIDAY, APRIL 23. THANK YOU FOR YOUR HELP.

LIVE LECTURE SYSTEM

The Live Lecture System is the accepted university teaching arrangement wherein the faculty member conducts live, in-person, class sessions with the students. Each semester, a faculty member could teach one off-campus section of a course that he/she normally teaches on campus. One night during each week of the semester, the faculty member would travel to an off-campus classroom to meet with the students and teach the class. Off-campus students would receive the same instruction and perform the same learning and assessment activities as on-campus students. Course registration and administration procedures would be handled by University College in conjunction with the faculty member's academic department. The faculty member would be reimbursed for his traveling expenses in addition to being paid for teaching the course. Travel time to and from the off-campus class would average an hour or less in each direction.

Please indicate the extent of your agreement with the following opinion statements about this system.
SA = Strongly Agree A = Agree N = Neutral D = Disagree SD = Strongly Disagree

1	SA	A	N	D	SD	The use of this system would help off-campus students maintain their motivation to complete the course.
2	SA	A	N	D	SD	Most off-campus students who took courses offered through this system would feel that they are receiving a "second-hand" education in comparison to that of on-campus students.
3	SA	A	N	D	SD	This system is not suitable for teaching most courses in my subject matter.
4	SA	A	N	D	SD	This system could improve the quality of many courses by causing professors to devote more attention to their teaching.
5	SA	A	N	D	SD	Many faculty would feel uncomfortable working in this kind of instructional environment.
6	SA	A	N	D	SD	The use of this system would contribute to a trend towards the lowering of academic standards and would generally have an adverse effect on the quality of the University's curriculum.
7	SA	A	N	D	SD	Most faculty would support the use of this system with continuing education programs.
8	SA	A	N	D	SD	This system would enable me to teach more students with little, if any, loss in the quality of instruction.
9	SA	A	N	D	SD	I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
10	SA	A	N	D	SD	This system would never work well because it limits the instructor's ability to adapt the instruction to the needs of the students.
11	SA	A	N	D	SD	This system would provide the kind of quality education people expect from a private university.
12	SA	A	N	D	SD	This system would be appropriate for most university courses and subject areas.
13	SA	A	N	D	SD	The use of this system would create political problems for some academic departments.
14	SA	A	N	D	SD	Overall, this system should help the University to make more efficient use of its faculty and instructional resources.
15	SA	A	N	D	SD	This system would attract new adult students to Syracuse University courses.
16	SA	A	N	D	SD	I feel that using this system would take too much of my time away from research and other activities necessary for promotion.
17	SA	A	N	D	SD	Most off-campus students would feel that this system provides enough opportunities for interaction with faculty.
18	SA	A	N	D	SD	I would definitely be willing to teach one of my courses using this system.
19	SA	A	N	D	SD	Testing and grading procedures could be handled efficiently under this system.
20	SA	A	N	D	SD	This system promotes an undesirable trend towards the standardization and commercialization of higher education.

Please list any additional issues that you feel are important to your judgment of this system. Use the back of the last page if you need more space.

INTERACTIVE INSTRUCTIONAL TELEVISION SYSTEM

This system is based on two-way audio and one-way video, closed circuit, television presentations of regular university class sessions. As the faculty member instructs an on-campus class, he/she is transmitted "live" to several off-campus classrooms equipped with television monitors. Students in the off-campus classrooms are able to interact with the instructor and participate in the on-campus class using special audio installations.

A faculty member using this system could teach his/her on-campus class in a normal fashion. The only changes would be the presence of television cameras in the classroom and the occasional interruption for a question from an off-campus student. Most classroom teaching techniques could be employed with little modification. Off-campus students would have their tests administered by a graduate assistant. For individual help, off-campus students would be expected to meet with the faculty member once during the semester and could call him/her by phone during specified office hours. Registration procedures, the administration of the off-campus classrooms, and the provision of books, supplies and televised lectures would be handled by University College (in conjunction with the academic departments). The faculty member would receive appropriate compensation for teaching the course, and would be assisted by at least one graduate assistant. Each faculty member would have absolute control over the right to make any recordings or reproductions of the televised lectures.

1	SA	A	N	D	SD	The use of this system would help off-campus students maintain their motivation to complete the course.
2	SA	A	N	D	SD	Most off-campus students who took courses offered through this system would feel that they are receiving a "second-hand" education in comparison to that of on-campus students.
3	SA	A	N	D	SD	This system is <u>not</u> suitable for teaching most courses in my subject matter.
4	SA	A	N	D	SD	This system could improve the quality of many courses by causing professors to devote more attention to their teaching.
5	SA	A	N	D	SD	Many faculty would feel uncomfortable working in this kind of instructional environment.
6	SA	A	N	D	SD	The use of this system would contribute to a trend towards the lowering of academic standards and would generally have an adverse effect on the quality of the University's curriculum.
7	SA	A	N	D	SD	Most faculty would support the use of this system with continuing education programs.
8	SA	A	N	D	SD	This system would enable me to teach more students with little, if any, loss in the quality of instruction.
9	SA	A	N	D	SD	I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
10	SA	A	N	D	SD	This system would never work well because it limits the instructor's ability to adapt the instruction to the needs of the students.
11	SA	A	N	D	SD	This system would provide the kind of quality education people expect from a private university.
12	SA	A	N	D	SD	This system would be appropriate for most university courses and subject areas.
13	SA	A	N	D	SD	The use of this system would create political problems for some academic departments.
14	SA	A	N	D	SD	Overall, this system should help the University to make more efficient use of its faculty and instructional resources.
15	SA	A	N	D	SD	This system would attract new adult students to Syracuse University courses.
16	SA	A	N	D	SD	I feel that using this system would take too much of my time away from research and other activities necessary for promotion.
17	SA	A	N	D	SD	Most off-campus students would feel that this system provides enough opportunities for interaction with faculty.
18	SA	A	N	D	SD	I would definitely be willing to teach one of my courses using this system.
19	SA	A	N	D	SD	Testing and grading procedures could be handled efficiently under this system.
20	SA	A	N	D	SD	This system promotes an undesirable trend towards the standardization and commercialization of higher education.

Please list any additional issues that you feel are important to your judgment of this system. Use the back of the last page if you need more space.

MEDIATED SELF-INSTRUCTION SYSTEM

This system is based on the use of prerecorded video tapes of class sessions. The faculty member teaches his/her regular on-campus class every week. Television cameras record the class on video tape. Later that week, duplicate video tapes are made and sent to each off-campus class location. The off-campus students can view the tape locally at anytime during the next week and are expected to keep up with and follow the same general schedule as the on-campus students. Faculty members would be available to off-campus students by phone during specific office hours each week. Off-campus students would also be expected to come to campus once or twice during the semester for personal counseling, testing, or instructional purposes. In short, off-campus students take the same course as on-campus students, but they do not participate in a "live" class, and hence, are more responsible for managing their own learning.

The video tape recording and distribution system (and other administrative details) would be handled by University College in conjunction with the academic departments. Special copyright agreements covering all uses of the tapes would be worked out with each faculty member. For their participation, faculty would receive appropriate compensation and the help of at least one graduate assistant.

1	SA	A	N	D	SD	The use of this system would help off-campus students maintain their motivation to complete the course.
2	SA	A	N	D	SD	Most off-campus students who took courses offered through this system would feel that they are receiving a "second-hand" education in comparison to that of on-campus students.
3	SA	A	N	D	SD	This system is <u>not</u> suitable for teaching most courses in my subject matter.
4	SA	A	N	D	SD	This system could improve the quality of many courses by causing professors to devote more attention to their teaching.
5	SA	A	N	D	SD	Many faculty would feel uncomfortable working in this kind of instructional environment.
6	SA	A	N	D	SD	The use of this system would contribute to a trend towards the lowering of academic standards and would generally have an adverse effect on the quality of the University's curriculum.
7	SA	A	N	D	SD	Most faculty would support the use of this system with continuing education programs.
8	SA	A	N	D	SD	This system would enable me to teach more students with little, if any, loss in the quality of instruction.
9	SA	A	N	D	SD	I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
10	SA	A	N	D	SD	This system would never work well because it limits the instructor's ability to adapt the instruction to the needs of the students.
11	SA	A	N	D	SD	This system would provide the kind of quality education people expect from a private university.
12	SA	A	N	D	SD	This system would be appropriate for most university courses and subject areas.
13	SA	A	N	D	SD	The use of this system would create political problems for some academic departments.
14	SA	A	N	D	SD	Overall, this system should help the University to make more efficient use of its faculty and instructional resources.
15	SA	A	N	D	SD	This system would attract new adult students to Syracuse University courses.
16	SA	A	N	D	SD	I feel that using this system would take too much of my time away from research and other activities necessary for promotion.
17	SA	A	N	D	SD	Most off-campus students would feel that this system provides enough opportunities for interaction with faculty.
18	SA	A	N	D	SD	I would definitely be willing to teach one of my courses using this system.
19	SA	A	N	D	SD	Testing and grading procedures could be handled efficiently under this system.
20	SA	A	N	D	SD	This system promotes an undesirable trend towards the standardization and commercialization of higher education.

Please list any additional issues that you feel are important to your judgment of this system. Use the back of the last page if you need more space.

GUIDED INDEPENDENT STUDY SYSTEM

The Guided Independent Study System is so named because it relies on students managing their own learning using specially designed materials which replicate the original, on-campus course without requiring live class sessions. The faculty member who normally teaches the on-campus course would design materials (e.g., exercises, programmed booklets, or special readings) to replace lectures and class sessions as the primary teaching strategy. Each off-campus student would receive a carefully structured instructional package including all materials and activities needed to complete the course at home. Off-campus students would usually come to campus twice each semester for assessment or special instructional activities. The faculty member would also be available to students by phone during specific hours each week.

This approach is based on a reorganization of the faculty member's time and instructional responsibilities. Rather than spending a number of hours every week in preparing and conducting each class session, the professor would do all of his/her preparation before the semester begins. Through University College (with the cooperation of the school or department) the faculty member would be provided with the financial, personnel, and material support to redesign his/her course for the off-campus students. Copyright and royalty agreements would be made with each faculty member for the instructional materials.

1	SA	A	N	D	SD	The use of this system would help off-campus students maintain their motivation to complete the course.
2	SA	A	N	D	SD	Most off-campus students who took courses offered through this system would feel that they are receiving a "second-hand" education in comparison to that of on-campus students.
3	SA	A	N	D	SD	This system is <u>not</u> suitable for teaching most courses in my subject matter.
4	SA	A	N	D	SD	This system could improve the quality of many courses by causing professors to devote more attention to their teaching.
5	SA	A	N	D	SD	Many faculty would feel uncomfortable working in this kind of instructional environment.
6	SA	A	N	D	SD	The use of this system would contribute to a trend towards the lowering of academic standards and would generally have an adverse effect on the quality of the University's curriculum.
7	SA	A	N	D	SD	Most faculty would support the use of this system with continuing education programs.
8	SA	A	N	D	SD	This system would enable me to teach more students with little, if any, loss in the quality of instruction.
9	SA	A	N	D	SD	I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
10	SA	A	N	D	SD	This system would never work well because it limits the instructor's ability to adapt the instruction to the needs of the students.
11	SA	A	N	D	SD	This system would provide the kind of quality education people expect from a private university.
12	SA	A	N	D	SD	This system would be appropriate for most university courses and subject areas.
13	SA	A	N	D	SD	The use of this system would create political problems for some academic departments.
14	SA	A	N	D	SD	Overall, this system should help the University to make more efficient use of its faculty and instructional resources.
15	SA	A	N	D	SD	This system would attract new adult students to Syracuse University courses.
16	SA	A	N	D	SD	I feel that using this system would take too much of my time away from research and other activities necessary for promotion.
17	SA	A	N	D	SD	Most off-campus students would feel that this system provides enough opportunities for interaction with faculty.
18	SA	A	N	D	SD	I would definitely be willing to teach one of my courses using this system.
19	SA	A	N	D	SD	Testing and grading procedures could be handled efficiently under this system.
20	SA	A	N	D	SD	This system promotes an undesirable trend towards the standardization and commercialization of higher education.

Please list any additional issues that you feel are important to your judgment of this system. Use the back of the last page if you need more space.

CHECK THE APPROPRIATE RESPONSE FOR EACH QUESTION (AND ADD EXPLANATIONS IF NEEDED)

1 Which system would you most prefer to use in teaching off-campus students?
___(1) Live Lecture ___(2) Interactive Instructional TV
___(3) Mediated Self-Instruction ___(4) Guided Independent Study

2 Which system would be your second choice?
___(1) Live Lecture ___(2) Interactive Instructional TV
___(3) Mediated Self-Instruction ___(4) Guided Independent Study

3 Considering all advantages and disadvantages, which system do you think most off-campus students would prefer?
___(1) Live Lecture ___(2) Interactive Instructional TV
___(3) Mediated Self-Instruction ___(4) Guided Independent Study

4 Do you think SU should expand its continuing education programs?
___(1) Yes
___(2) No

5 Have you ever taught courses through University College (or similar branch of another university)?
___(1) Yes (The date of the most recent semester?)_____
___(2) No

6 If you answered "Yes" to question 5, on what basis were you paid for teaching those courses?
___(1) Part-of-load
___(2) Over-load
___(3) Other (Please explain)_____

7 Have you ever used instructional television to teach a course?
___(1) Yes (Describe)_____
___(2) No

8 Have you ever used other instructional media, such as film, audio cassette, or programmed instruction to teach a course?
___(1) Yes (Describe)_____
___(2) No

9 Have you ever taught at a Syracuse University Graduate Center (Corning, Endicott, Poughkeepsie, Rome) or Utica College?
___(1) Yes (Which one?)_____
___(2) No

10 Check any of these SU organizations that you have had personal experience with:
___(1) Independent Study Degree Program
___(2) Extended Campus
___(3) Center for Instructional Development

BIOGRAPHICAL DATA

11 Academic Rank: ___(1) Assistant Professor ___(2) Associate Professor ___(3) Professor
___(4) Other (please explain)_____

12 Tenure Status: ___(1) Tenured ___(2) Not yet tenured ___(3) Not eligible for tenure

13 School or College:_____

14 Years teaching at Syracuse University: ___(1) Two years or less ___(2) Three to five ___(3) Five or more

15 Years teaching at other higher education institutions:_____

16 How many other higher education institutions have you taught at?_____

17 What is your highest degree?_____

18 During the current semester, approximately how many hours do you spend each week in formal instruction in the classroom?
_____(1) Hours in lower division instruction
_____(2) Hours in upper division instruction
_____(3) Hours in graduate instruction

Thank you very much. I would appreciate any suggestions or comments you care to make. Please place your completed questionnaire in the attached envelope and mail it by Friday April 23. If you have any questions, contact Richard Lent at 423-3153 or 423-4571.

SYRACUSE UNIVERSITY

SCHOOL OF MANAGEMENT | Masters in Business Administration Program
Master of Science in Accounting

CHARLES A. MCINTOSH, JR.
ASSISTANT DEAN—DIRECTOR, MASTERS PROGRAMS

101 SLOCUM HALL | SYRACUSE, NEW YORK 13210
TELEPHONE 315 | 423-3850, 4327, 3006

April 12, 1976

Dear Professor Last-Name,

Last week you received a questionnaire from this office regarding various instructional arrangements for continuing education programs. We need your response to that questionnaire. This information is an important part of a study to help the University plan for the future. Only through your participation will the results of this survey be truly representative of our faculty.

Please take a few minutes now and complete the questionnaire. You may return it to this office or mail it in the envelope supplied with the survey. If you have any questions, or if you need another copy of the survey, call Richard Lent at 423-4571 or 423-3153. Additional copies of the questionnaire are also available in this office.

Your help will be appreciated.

Sincerely,

C. A. McIntosh

Charles A. McIntosh, Jr.
Assistant Dean

P.S. If you have already responded to the survey, please disregard this letter and accept our sincerest thanks.

Table 12

ANALYSIS OF VARIANCE SUMMARY TABLE
FOR TWENTY-ITEM SURVEY SCALE*

Source of Variation	SS	df	MS	F
Between Subjects	6134.766	1		
Within Subjects	128.5278	168		
Treatment (Delivery System)	107.4347	3	35.81157	114.5690*
Residual	157.5384	504	.3125762	

*$F_{.95}(3,504) = 2.60$

Computed with BMD 08V for analysis of variance with repeated measures on the same subjects. See text under "Acceptability" criterion for full explanation of the survey and its results.

*Referred to on page 34 of the text.

FACTOR ANALYSIS OF RESPONSES*

The deadlines for the study and this report have precluded all but a cursory examination of the factors underlying the faculty's reaction to the delivery systems on the questionnaire. Preliminary findings from a factor analysis (with orthagonal rotation) of their responses to each system taken individually suggests that the 20 item scale groups into three or four factors depending on the system being judged. Further analysis is needed (including an analysis of the factor structure underlying the simultaneous consideration of responses to all four systems across the 20 items) before any defensible conclusions can be drawn about the ways in which faculty react to the delivery systems. However, the preliminary analysis does suggest one factor which appears consistently enough to be worth reporting here. This factor is composed of those items which reflect the faculty member's concern for his teaching role and responsibilities. The following four items seem to be the primary members of this factor.

> Many faculty would feel uncomfortable working in this kind of instructional environment.
>
> Most faculty would support the use of this system with continuing education programs.
>
> I feel that teaching one of my courses under this system would require me to spend too much extra time and effort to be worth it.
>
> I feel that using this system would take too much of my time away from research and other activities necessary for promotion.

What these tentative findings suggest is that if a delivery system is to be favorably received by the faculty, it must be presented and introduced in a manner which indicates that it is compatible with the faculty's perception of their present role. Other factors which may show up in subsequent analyses include items related to the instructional quality and efficiency of the systems.

*Referred to on page 72 of the report.

SAMPLE FACULTY COMMENTS ON SURVEY

I assume payment for teaching (on these systems) is on overload.

In general, I would favor a combination of lecture/discussion and guided independent study. Given my kind of material and understanding of the educational process, the Interactive Instructional Television system, in general, would be a less than satisfactory system, and probably not worth the expense it would entail. The Mediated Self-Instruction system might well be incorporated into the combination of direct contact and independent study that I suggested above. As a less expensive alternative to the TV system it might be OK, by itself, but not as good as a combination.

In addition to a class, beginning students need help from the instructor who must be available to them one or two hours a week. Office hours could take place right before class time. The television/mediated/independent study systems may work with highly motivated and gifted students, but the off-campus students should be required to come to campus twice each semester--at the beginning of the semester and right after midterm.

Having taught using this system (Live Lecture) at another university, I feel the most severe drawback is inadequate library facilities. Students lack access to current books and periodicals offering a variety of opinions on relevant issues. The professor may be forced to relying too heavily on a textbook. Also the professor may be forced into the role of librarian which becomes annoying and complicated. Some alternative procedure for reading materials would need to be developed to make classes equal to those on campus and therefore worthy of university credit.

(Letter from a professor in the College of Visual and Performing Arts)

You will notice that I have not completed the enclosed survey. I feel unable to do so because of the nature of the courses which I teach, namely art studio courses in painting and drawing. These courses have traditionally been taught pretty much on a one-to-one basis, i.e. with close interaction between teacher and student in the studio once a week.

Among the four instructional systems, number one (Live Lecture) is, in my opinion, the most feasible for studio art courses, provided a studio was available in which to conduct the class. However, I personally would not wish to drive to Watertown or even Oneida to conduct such a course.

Over the years I have had some students who were willing--even eager--to drive in to University College from as far away as Binghamton. In other words, I feel that a strongly motivated student should be willing to commute if he or she wants to study with me, and if the student is not that motivated he should go elsewhere.

My experience indicates that TV presents problems with clarity of image for some instruction.

I don't like the idea of merely videotaping classroom lectures. If this approach is done, it must be the result of specially prepared TV studio production. Properly done, this approach will achieve quality instruction and good student morale. Also, in #2 (Interactive ITV), forget the audio feedback, its not worth the money.

I'm sorry, but my classes are based on one-to-one relationships. This (Mediated Self-Instruction) would never be acceptable to me as a productive method.

I don't see how one can talk about quality in an academic program without the availability of a hands-on computer facility. The faculty passes computer requirements for on campus programs but somehow we pretend that such requirements are void for off-campus programs. (School of Management)

In my opinion, the amount of overload work the faculty is encouraged to undertake, will ultimately neutralize the gain to be made through expansion--i.e. the national reputation of the school will go down if a large portion of the faculty is continually working on overload. An expansion of continuing education is desirable; but only if more faculty are hired. Also, no one should be forced to take an overload.

Instruction in painting and drawing cannot, in my judgement, be conducted over television; courses in art history or aesthetics might be adaptable to such an approach.

I favor external degrees, but this requires a major commitment, I believe, in staff, organization, etc. I don't think this teaching is easily combined with usual instruction.

Good faculty teach good courses, regardless of instructional system.

GET THE FACULTY TO THE STUDENT!! I have worked for two years in the off campus program of Rome/Utica and the reception by students is tremendous!

Having been heavily involved in instructional TV, I am very dubious about the quality of the product. Briefly, some of my observations are as follows:

1. Total development costs are extremely high if a reasonable product is to be expected. My own best estimate is that the "per lecture" cost would be about $5,000.
2. In general, it seems to provide a better product if professional TV actors and actresses are used, with the professor scripting the presentation.
3. A number of areas are very well covered by commercial tapes--at least in data processing.

In spite of my answers, I am willing to try any scheme. I have tried TV, but was not too happy with it for the particular course. All four schemes may lead to inferior quality. To avoid this, we must accept lower completion rates (more realistic completion rates) such as 30%, 20%, or even 10%.

I have suggested in the past that we should move towards having TV for off-campus centers and local industry. It does work in my opinion.

My one reservation about this system (Guided Independent Study) would be the loss of interaction between teacher and student...however as I think about the situation in large lecture classes, maybe not so much is lost. An extremely nice questionnaire!

(In reference to item #14: Overall. this system should help the university to make more efficient use of its faculty and instructional resources).
In all four systems, I hedged my answers. The question is complicated by the fact that "instructional resources" is a very ambiguous word--and I don't know whether you mean soft-ware, hard-ware, Bird Library, CID and its personnel, or what. And who can say what is the best deployment of all faculty--perhaps the best "use" is to encourage each faculty member to do his own thing: let good lecturers lecture, good interaction people lead discussions, good researchers lead small and highly select seminars, those expressing interest in innovation be assisted and non-directively advised in designing new courses, etc.

My subject (English) could be taught as well this way (Live Lecture) as any other, but I would not personally want to involve myself in the extra time and hazardous winter driving.

In Social Work, approximately 2/3 of the students who take classes at Utica eventually enroll in our Master's program. Thus this limited program is a resource to students and to Syracuse University.

Systems I & II (Live Lecture and Interactive ITV) to me are the only systems that do not infringe on the academic rigor and communication necessary for quality education. System III (Mediated Self-Instruction) would be fine for non-credit "experiences". System IV (Guided Independent Study) would be fine if the student were required to meet six times a semester with faculty, and if faculty could provide direction for the student as opposed to specific, apriori lectures, notes, etc.

In general, I believe that one or more of these methods is absolutely essential if S.U. is to survive the late '70's and the '80's. We should Get With It, as soon as possible, before other schools in this area beat us to it. Circulating questionnaires is OK, but the results of most surveys of SU faculty will not show any clear consensus. In any case, regardless of the results of the survey, the University should start making plans to extend its off-campus programs, using those faculty who are willing to put in the effort to make these courses available. It will be very difficult, if not impossible, to convince the majority of faculty of the necessity of doing this, and indeed, the traditional views of the senior faculty will probably never allow them to be particularly supportive of such programs. Also, the emphasis of departments on traditional forms of teaching and research will mean that they will not be particularly enthusiastic about their faculty participating in such programs, unless there are financial or other advantages for the departments. In short, although such programs are essential to our survival, the built-in limitations of S.U.'s traditional academic organization will not help to get them going.

APPENDIX B

Supplementary Cost Data

TABLE 13

DETERMINATION OF FACULTY BASE SALARY[1]

ACADEMIC AREA	AVERAGE SALARY FOR ALL FACULTY	AVERAGE SALARY INCREASE 1974-75
College of Engineering	$23,222	7%
School of Management	$20,555	5%
All University	$19,234	5.5%
University College[2]	$20,561	5%

[1]Based on Syracuse Chapter AAUP, "Committee Z Report," April 12, 1976.

[2]Represents estimated average salary for all faculty teaching courses through University College. It does not include adjunct appointments, lecturers, or teaching assistants. Computations for average salary were based on the fact that there are about as many Management and Engineering faculty teaching U.C. courses as there are all others combined. The assumption is that this mix will continue.

Referred to on page 47 of the report.

TABLE 14*

EXAMPLE SALARY INCREASES FOR TEN YEARS
AT FIVE PERCENT PER YEAR

	FACULTY			ADMINISTRATOR		SECRETARY	
YEAR	AVERAGE SALARY	12.5% OF SALARY	FRINGE BENEFITS	BASE SALARY	FRINGE BENEFITS	BASE SALARY	FRINGE BENEFITS
One	$20,560	$ 2,570	$ 630	$ 15,000	$ 3,675	$ 6,000	$ 1,470
Two	$21,588	$ 2,699	$ 661	$ 15,750	$ 3,858	$ 6,300	$ 1,543
Three	$22,667	$ 2,833	$ 694	$ 16,538	$ 4,052	$ 6,615	$ 1,621
Four	$23,800	$ 2,975	$ 728	$ 17,365	$ 4,254	$ 6,946	$ 1,702
Five	$24,990	$ 3,124	$ 765	$ 18,233	$ 4,467	$ 7,293	$ 1,786
Six	$26,240	$ 3,280	$ 803	$ 19,145	$ 4,690	$ 7,658	$ 1,876
Seven	$27,552	$ 3,444	$ 843	$ 20,102	$ 4,925	$ 8,040	$ 1,970
Eight	$28,930	$ 3,616	$ 886	$ 21,107	$ 5,171	$ 8,442	$ 2,068
Nine	$30,377	$ 3,797	$ 930	$ 22,162	$ 5,429	$ 8,864	$ 2,171
Ten	$31,896	$ 3,987	$ 976	$ 23,270	$ 5,701	$ 9,307	$ 2,280
Totals		$32,325	$7,916	$188,672	$46,222	$75,465	$18,487

*Referred to on page 47 of report.

TABLE 15

OPPORTUNITY COSTS FOR CAPITAL INVESTMENTS
OVER TEN YEARS AT EIGHT PERCENT EACH YEAR

Referred to on pages 49, 51

YEAR	TOTAL REMAINING AFTER DEPRECIATION	OPPORTUNITY COST	TOTAL REMAINING AFTER DEPRECIATION	OPPORTUNITY COST	TOTAL REMAINING AFTER DEPRECIATION	OPPORTUNITY COST
One	$100,000	$ 8,000	$200,000	$16,000	$400,000	$ 32,000
Two	$ 90,000	$ 7,200	$180,000	$14,400	$360,000	$ 28,800
Three	$ 80,000	$ 6,400	$160,000	$12,800	$320,000	$ 25,600
Four	$ 70,000	$ 5,600	$140,000	$11,200	$280,000	$ 22,400
Five	$ 60,000	$ 4,800	$120,000	$ 9,600	$240,000	$ 19,200
Six	$ 50,000	$ 4,000	$100,000	$ 8,000	$200,000	$ 16,000
Seven	$ 40,000	$ 3,200	$ 80,000	$ 6,400	$160,000	$ 12,800
Eight	$ 30,000	$ 2,400	$ 60,000	$ 4,800	$120,000	$ 9,600
Nine	$ 20,000	$ 1,600	$ 40,000	$ 3,200	$ 80,000	$ 6,400
Ten	$ 10,000	$ 800	$ 20,000	$ 1,600	$ 40,000	$ 3,200
Total		$44,000		$73,600		$176,000

"Opportunity costs" represents the cost of tying capital up in a long term investment. This cost is represented by an interest rate since the "cost" of the capital can be seen as the interest rate that would be paid for its use. The specific choice of an eight percent rate is arbitrary. The rate could have easily been either five or ten percent. For futher information see Wagner (1975, p.339) or Levin (1975, 102).

Table 16

COMPUTATION OF UNIT COSTS FOR
MEDIATED SELF-INSTRUCTION

Cost Model

$$\text{Average cost per-student, per course, for 10 years} = S_a = \frac{(R+D)_t + (I+P)_t + OI_t + OA_t}{E_t}$$

Computation

Step	Symbol	Definition	Procedure
1	E_t	Average enrollment per semester	Six enrollment levels have been chosen arbitrarily: 100, 500, 1000, 1500, 2000, 2500. Unit costs are figured for each level.
2	Model I Model II	Predictions of average enrollment per course used to determine number of courses taught at each enrollment level (Step 1)	Figures for the average number of course offerings per semester from Table 3 are used as appropriate to the system and enrollment level under consideration.
3	$(R+D)_t$	Total research and development costs. (Including recurring course development costs for Guided Independent Study)	Total research and development costs as given in system cost tables (Table 6 for Mediated Self-Instruction) are used for all computations. Mediated Self-Instruction Total = $37,185
4	$(I+P)_t$	Total investment and production costs	(From Table 6 cost data for Mediated Self-Instruction) Total capital investment of $104,485 (excluding video tape) is depreciated over 10 years with an opportunity cost of 8% per year totaling $44,000. To the sum of these two figures is added the cost of the video tape. See below. Total video tape investment = $27.00/tape, X ____courses, X 3hours/week, X 5copies/hour, X 4weeks turn-around-time. The number of courses/semester was determined in Step 2, and this figure is multiplied by 10 years at 2 semesters per year, and the result is plugged into the formula and provides the following estimates at each enrollment level.
5	OI_t	Total operating costs for instruction	Costs for personnel are taken from Table 6 (for this system) and the faculty salaries are assumed to increase at 5% per year. The resulting salary expenditure for one course offered once a year for ten years is $32,325, with fringe benefits totaling $7,916.

Enrollment Level	Model I	Model II
100	$4536	$1620
500	$22,518	$5346
1000	$45,036	$10,854
1500	$67,554	$16,200
2000	$90,072	$21,546
2500	$112,428	$27,054

Table 16

Continued

Step	Symbol	Definition	Procedure
5 (Continued.....)			The cost of graduate assistants and miscellaneous items are affected by the use of Model I or Model II predictions. Under Model I, the graduate assistant cost is $800 per course/semester and miscellaneous expenses total $955. Under Model II, the costs are $2600, and $3980 respectively. These figures are multiplied by the total number of courses to be offered over ten years--according to enrollment level and Model I, or II predictions. OI_t estimates for ten years:
6	OA_t	Total operating costs for administration.	The salary costs for all personnel (as listed in Table 6) are increased by 5% per year and added to the ten year total for administration's miscellaneous costs. The resulting figure is $1,158,799.

Enrollment Level	Model I	Model II
100	$289,917	$167,642
500	$1,439,233	$553,218
1000	$2,878,468	$1,123,201
1500	$4,317,701	$1,666,420
2000	$5,756,935	$2,216,339
2500	$7,185,815	$2,782,921

Computation of Unit Cost for 1000 Students/Semester
And Model I Predictions of Class Size

$$S_a = \frac{(R+D)_t + (I+P)_t + OI_t + OA_t}{E_t}$$

$$S_a = \frac{37,185 + 193,521 + 2,878,468 + 1,158,799}{20,000}$$

$$S_a = \frac{4,267,973}{20,000}$$

$$S_a = \$213.40$$

Referred to on page 62.

CAPITAL COSTS FOR INTERACTIVE INSTRUCTIONAL TELEVISION SYSTEMS AS PRESENTED IN MORRIS (1974)

University ITV system Capital Budget (p. 34)

	Number of ITFS Channels 1 (dollars)	2 (dollars)	3 (dollars)	4 (dollars)
Consulting and legal fees	20,000	20,000	20,000	20,000
Program management, design engineering and drawings	35,000	35,000	35,000	35,000
Installation and Test	44,000	57,000	69,000	80,000
Studio classrooms equipment	23,000	46,000	69,000	92,000
Studio control	19,000	37,000	56,000	74,000
Master control	8,000	27,000	46,000	49,000
RF transmission equipment emergency power	75,000	88,000	102,000	116,000
Talkback receiving equipment	26,000	27,000	29,000	30,000
Spare parts	6,000	12,000	18,000	24,000
Test equipment	15,000	15,000	15,000	15,000
Room modifications	20,000	40,000	60,000	80,000
Totals	291,000	404,000	519,000	615,000
	Minnesota Cost →		Stanford Cost →	

Stanford Participating Facilities Costs (p. 36)
(at a given geographic location)

	RF Delivery System Number of Classrooms 1	2	3	4
TV Set	$ 290	$ 580	$ 870	$1,160
Cart	75	150	225	300
Antenna, mast, down-converter, power supply, cabling, installation, checkout	1,868	2,298	2,728	3,158
Totals	$2,233	$3,028	$3,823	$4,618

This data was reanalyzed and modified to fit the setting and the delivery systems as described in this study. Morris provided these adjusted cost estimates in private conversations with the author of this report during the Spring of 1976. Cost estimates were based on Morris' experience with Genesys Systems in working with a number of university television systems. Morris' previous cost estimates for such systems have proven to be accurate. See pages 49-52 of this report for further discussion.

The following information was used in estimating facilities and equipment costs for Mediated Self-Instruction. See page 53 of text. Table 6

SYRACUSE UNIVERSITY
AUDIO AND VISUAL SUPPORT SERVICES | Video Services
164 NEWHOUSE II | 215 UNIVERSITY PLACE | SYRACUSE, NEW YORK 13210

Att: Rick Lent

Subj: Remote control TV installed in a business management classroom.

Date: 6/-6/76

From: W.F. Denne

The following is an estimated equipment and installation cost estimate for your proposal project. I have also included the annual salary and maintenance cost estimates. An overview of the project is:

Equipment & Installation:	$ 60,235.00
Engineering Salaries (per year):	19,840.00 to $26,040.00
Maintenance Materials (per year):	6,023.50

a break down of these cost follows:

TV Cameras

Quan.	Number	Cost ea.	Total
6	AVC 3250 ensembles	$960.00	$5,760.00

Video Cassette Recorders

2	VO-2850 editing mdl.	$6,000.00	$12,000.00
1	Editing Console		4,000.00
2	VO-1800	$1,640.00	3,280.00

Audio

6	Electrovoice RE-10 microphones	$ 100.00	600.00
3	Shure M-67 mic mixers	185.00	555.00

Monitors

Quan.	Number	Cost ea.	Total
12	Sony CVM-15 rec/mon 11" B/W	$ 315.00	$ 3,780.00
6	CVM-194-U rec/mon 18" B/W	350.00	2,100.00
6	Monitor costs or Ceiling fixtures	60.00	360.00

Switching & Spec. Eff.

2	Sony SEG-1A	800.00	1,600.00
1	Telestrator		14,000.00

Remote Control

6	Pan-Tilt & Zoom controls (one per camera) est.	$1,200.00	7,200.00

Installation

	Wire, renovating etc. est.	5,000.00	60,235.00

Engineering Salaries

Video engineer per yr.	$11,000. to	$13,000.
Engineering assistant per yr.	$ 5,000. to	$ 8,000.
+ 24% overhead	$ 3,840. to	$ 5,040
TOTAL	$19,840. to	$26.040.

Maintenance Materials

10% of initial Equipment cost	$ 6,023.50